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NETWORK WORLD

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

NET ushers users into the age of ATM

BY MAUREEN MOLLOY

Redwood City, Calif.

Network Equipment Technologies, Inc. (NET) last week offered its customers a bridge from the time-division multiplexing world of today to an Asynchronous Transfer Mode (ATM) future.

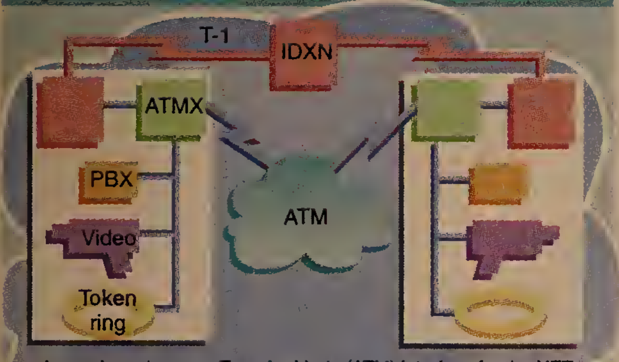
The company announced an ATM interface for its IDNX T-1 mux that will let customers extend premises-based ATM networks across a wide area and take advantage of ATM carrier services as they become available.

"There's a big difference between a plan to build an interstate highway system and a plan to put men on Pluto by the year 2000," said Tom Nolle, president of CIMI Corp., a consultancy in Voorhees, N.J. "Most of the ATM vendors have been doing the Pluto announcements, while NET is trying to build the interstate highway."

The company also announced a host of interfaces for its ATMX ATM work group hub — including Ethernet,

See **NET**, *page 62*

The hybrid ATMX/IDNX enterprise net



A new Asynchronous Transfer Mode (ATM) interface for the NET IDNX T-1 multiplexer will enable users to integrate ATM local net devices and carrier services into the enterprise.

SOURCE: NETWORK EQUIPMENT TECHNOLOGIES, INC., REDWOOD CITY, CALIF.
GRAPHIC BY TERRI MITCHELL

Look out below: Cisco eyes low-end market

Industry leader preps line of easy-to-use, low-cost routers.

BY MAUREEN MOLLOY

Menlo Park, Calif.

Cisco Systems, Inc., which already dominates the upper reaches of the internetworking realm, this week will invade the lucrative low end of the market with a line of easy-to-configure, aggressively priced routers.

The company's Cisco 2000 series is expected to include a software-based router and a stand-alone dial-up router — each priced at about $2,500. In a sharp shift in strategy, Cisco will open its sales channels to market the products through so-called factory distributors.

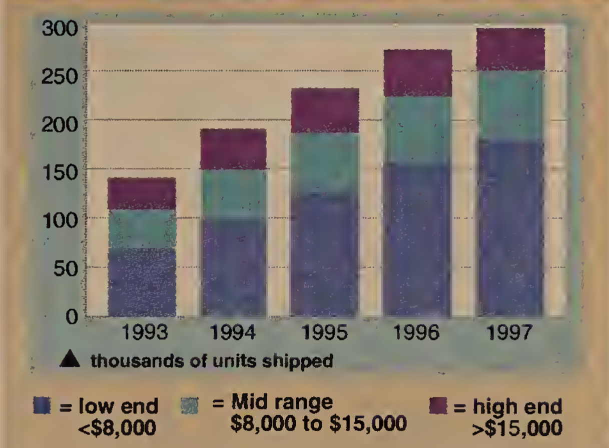
Cisco confirmed it will unveil a line of remote routers this week, along with enhancements to an existing product. The company declined to provide details but said the new products will enable Cisco to offer "a total solution" — from top-of-the-line backbone routers to products for smaller sites.

Sources said the new software-based router will run on an Intel Corp. 386- or 486-based personal computer and support up to four local- or wide-area interfaces, including Ethernet, token ring, X.25 and leased lines at up to T-1.

The dial-up router is targeted at remote sites and will also support a maximum of four local-area net-

See **Cisco**, *page 62*

The shifting router market



SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS.
GRAPHIC BY SUSAN SLATER

PRODUCT EVALUATION

Easing the pain of a **NetWare 4.0** *upgrade*

BY JIM BROWN AND STEPHEN MATTIN

Planning an upgrade to Novell, Inc.'s NetWare 4.0 is a good reason to stock up on pain relievers — especially if your head is still hammering from the move to NetWare 3.X.

NETWORK WORLD TEST ALLIANCE

While a *Network World*/Focus Software, Inc. product evaluation shows NetWare 4.0 delivers on Novell's promise of enhanced services for enterprise nets, just about every part of NetWare — even some of its basic underpinnings — have undergone major changes.

Understanding these changes well enough to concoct an upgrade strategy will force users into a brain-draining planning process. There are enough nuances to NetWare 4.0 to make going into an upgrade blind — even if just partially — ill-advised because you will eventually encounter some gotchas.

See **Feature**, *page 47*

NEWSPAPER

100

Directory sync plans under way

BY BOB BROWN

Atlanta

More than 100 users and vendors of electronic messaging systems met here last week to begin work on a standard for directory synchronization, a key enabler for building enterprise E-mail systems.

The meeting did not — and was not intended to — result in an immediate solution. But it provided a forum for users and vendors, including Digital Equipment Corp., Novell, Inc., Retix and Soft-Switch, Inc., to pitch methods for solving the current directory synchronization dilemma with an eye toward moving to X.500.

The meeting's cosponsors, the Electronic Mail Association (EMA) and the X.400 Application Program Interface Alliance (XAPIA), will analyze the information presented and come up with an agenda. XAPIA, which has been moving beyond its original charter as an X.400 API group, will likely take on the job of developing a common synchronization specification, members said.

Directory synchronization is emerging as a huge issue for companies linking

See **Sync**, *page 63*

Unifying objects

BY WAYNE ECKERSON

San Francisco

With one eye on Microsoft Corp. and the other on specifications being hammered out by the Object Management Group (OMG), IBM, Hewlett-Packard Co. and SunSoft, Inc. last week closed ranks and agreed to establish portable and interoperable implementations of their distributed object management systems.

The move represents an attempt by the three companies to establish de facto standards for integrating distributed object computing environments that would be adopted by the OMG as part of its Common Object Request Broker Architecture (CORBA). CORBA defines a common way for objects to exchange messages across a network.

"These companies are jockeying for position to establish an interoperability specification for

See **Objects**, *page 62*

Novell organizes its application strategy

BY CARYN GILLOOLY

New York

At PC Expo here next week, Novell, Inc. is expected to pull together all the pieces of its application development puzzle with the introduction of AppWare.

AppWare, according to sources, is an object-oriented application development architecture — complete with development tools — that will make it easier to develop distributed client/server applications within a NetWare environment.

A Novell spokeswoman confirmed the June 28 architecture rollout, saying it will bring to light how Novell's mergers with Serius Corp. and Software Transformation, Inc., and its agreement with HyperDesk Corp. will fit into the NetWare environ-

See **Novell**, *page 62*

PAGE TWO

Briefs

JCPenney tabs AT&T for national data net. JCPenney Company, Inc. said AT&T is constructing a multimillion-dollar high-speed digital network linking its 1,300 U.S. stores with three primary data centers around the country. The network will support existing credit authorization, point-of-sale and inventory control applications as well as new retail applications. Digital Access and Cross-Connect Systems at the data centers will be served by redundant, diversely routed 45M bit/sec links. The net will be centrally managed from JCPenney's headquarters in Plano, Texas, and is expected to be completed by October.

Going through hoops. Adobe Systems, Inc. last week announced the availability of its Acrobat software, which is designed to let users exchange complex electronic documents from diverse hardware, operating system and application platforms (*NW*, Dec. 9, 1991, page 17). The Apple Computer, Inc. Macintosh and Microsoft Corp. Windows versions of the three Acrobat products are available now. DOS and Unix versions are expected late in the year. Eleven companies, including Lotus Development Corp. and Ventura Software, Inc., have announced support for Acrobat or Adobe's Portable Document Format specification for document sharing. Adobe: (800) 872-3623.

Going mobile. Motorola, Inc.'s Paging and Wireless Data Group announced a new line of wireless modem cards for laptops and other computers that are based on the industry-standard Personal Computer Memory Card International Association (PCMCIA). Motorola will make the Type II PCMCIA cards available within 18 months. In addition, Ericsson GE unveiled the Mobidem AT, a wireless packet radio modem that implements the circuit-switched AT command set interface. The Mobidem AT, designed for use with RAM Mobile Data, Inc.'s network, is priced at $775.

Novell promotes 4.0. Novell, Inc. last week said it will give new and current users of NetWare 4.0 free product maintenance. Customers that register their purchase of 4.0 before Oct. 31 will receive all network operating system enhancements, including all updates and revisions, free of charge through April 30 of next year.

Object of desire. Digital Equipment Corp., IBM and SunSoft, Inc. last week announced new and enhanced tool kits for building distributed object applications. IBM's SOMobjects Developers Toolkit incorporates its System Object Model (SOM) and Distributed SOM (*NW*, May 24, page 1) and will ship in the third quarter on OS/2 and AIX/6000. Future support is planned for MVS, OS/400, Microsoft Corp. Windows and Apple Computer, Inc. Macintosh. SunSoft offered a pre-beta developers' release of its Distributed Objects Everywhere object computing environment, with general availability scheduled for next year. DEC will integrate its ACA Services distributed object management system with Microsoft's Visual Basic programming tool to allow calls to ACA Services from within Visual Basic applications. DEC will also integrate ACA Services with IXI Corp.'s XWindows and Microsoft Windows.

Lighting up NetWare. SunConnect and Novell, Inc. are expected to announce this week a joint development plan aimed at forging a link between SunConnect's SunNet Manager and Novell's NetWare Management System (NMS), according to sources familiar with the companies' plans. The link would enable data collected by distributed NMS nodes to be sent to and analyzed by an administrator at a central SunNet Manager console.

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Network HELP desk

Network World *tracks down answers to your questions regarding products, services, technologies and concerns about vendors. Please submit questions to Susan Collins at (800) 622-1108, via fax at (508) 820-3467 or via the Internet at scollins@world.std.com.*

One of our departments is considering obtaining a multiprocessor server for its local-area network, and we were questioning whether Novell, Inc. NetWare 3.11 will function properly on a multiprocessor server.

Charles Brown, Jackson, Miss.

Ronald Nutter, escalation manager of 900 Support, an around-the-clock Novell technical support company in Lake Oswego, Ore., replies:

Ask the vendor that will be supplying the server to see if it has been tested by Novell. Unless Novell has a special version of the operating system available, the product will not be able to take advantage of the multiple processors because it will not understand how to spin off tasks to the other CPUs. However, the operating system should run on a single processor unless you're doing something proprietary with the hardware.

We recently installed Standard Microsystems Corp. (SMC) Elite32 network interface cards in two servers. Now the servers lock up whenever we write to them from a workstation. Our servers have 80486-based, 50-MHz Extended Industry Standard Architecture (EISA) motherboards and EISA Small Computer System Interface host adapters. The cards only work with the bus mastering disabled and then only for a few days. How can we use the cards in bus mastering mode?

Bruce Gill, Whitefish Bay, Wis.

Bob Sparanese, Ethernet product marketing manager for SMC, replies:

The situation you describe sounds like an incompatibility problem between the servers and the cards caused by different interpretations of the EISA specification. The advantage of the basic EISA specification is the bus mastering capability and the higher performance it delivers. Bus mastering allows multiple plug-in devices to take direct control of the personal computer's bus at unique points in time, eliminating time-consuming

See **Help desk**, *page 46*

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Bellcore to announce key SMDS spec

BY BOB WALLACE

Livingston, N.J.

Bell Communications Research will soon announce a way for local carriers to offer low-speed access to Switched Multimegabit Data Service (SMDS), which could widen the appeal of the emerging data networking service.

Bellcore's SMDS Interface Protocol Relay Service (SIP Relay) specifications will detail how local carriers can support access to SMDS services over 56K or 64K bit/sec frame relay connections. That will make it easier for users to tie smaller sites that cannot justify T-1 access into an SMDS network.

"Local exchange carriers will use SIP Relay Service to dramatically expand the existing market for SMDS," said Paul SanChirico, director of broadband data services at Bellcore. "Not everyone can justify a T-1 or a T-3."

"This is the single most important development since SMDS was announced," said Tom Nolle, president of CIMI Corp., a Voorhees, N.J., consultancy. "This will increase by four or five times the number of companies that could justify the service." Nolle predicts local carriers will begin rolling out SIP Relay Service in early 1994.

Delivery of the technical reference will cap months of work by Bellcore. The SMDS Interest Group, which represents carriers and equipment vendors, had input in the creation of the document.

Current SMDS users said frame relay access to SMDS is an important step in the evolution of the high-speed, packet-oriented digital data service. That is because private lines are not cos- effective for one-to-many applications. For example, an automaker with casual data traffic with hundreds of suppliers could not justify private lines.

Unlike frame relay, which is largely useful for intracompany applications, SMDS is designed for intercompany communications. One user can communicate with any other company served by a local SMDS network without needing a dedicated connection. The service supports group addressing, allowing a single message to be transmitted to multiple recipients.

With SIP Relay, SMDS data from a router is encapsulated in a frame relay frame and delivered to an SMDS switch. A gateway takes the frame relay header off and routes the data across the SMDS network. If the destination is an SMDS site, the data is sent without change. Otherwise, the SMDS data would be passed to another gateway unit, which would reencapsulate it into a frame relay frame for delivery.

SanChirico said Bellcore plans soon to begin beta tests of SIP Relay with a few Bell operating companies, but he would not name them. The local carriers that already offer SMDS are enthusiastic about SIP Relay Service.

"We've had calls from users that say they're interested in it," said Mark Fisher, SMDS project manager for Pacific Bell. "We need to do more research, but we've decided this is a great opportunity for us." ⧉

Firm explores video uses

BY ELLEN MESSMER

Washington, D.C.

Videoconferencing isn't just a way to save on airfares anymore.

Companies are now using it for everything from product development to focus groups and merchandise inspection.

The Department of Veterans Affairs (VA), for example, has just begun two "telemedicine" pilot projects — one in Twin Ports, Wis., and the other in Bay Pines, Fla. VA doctors in separate health care facilities can confer, transfer X rays and even examine patients via videoconferencing.

The VA and other users detailed applications they have discovered for videoconferencing at last week's International Teleconferencing Association (ITCA) show here.

MENDONSA

Maralyn Rosenblatt, senior telecommunications systems specialist at Lockheed Corp., which has a 12-site video net operating at 768K bit/sec, said her company is conducting weekly meetings with The Boeing Co. and General Dynamics Corp. as the three firms team on development of the Air Force F-22 fighter, a recent contract win. She said the companies are encrypting their video sessions for security reasons.

Rosenblatt, who said she polled 25 companies on how they are using their videoconferencing facilities, told ITCA attendees she found that many have discovered innovative ways to tackle business problems.

At Levi Strauss & Co., which has a 13-node global videoconferencing network, the marketing department uses videoconferecing to conduct focus group meetings, where customers are questioned about their merchandise selections and preferences.

Arthur Andersen & Co. uses its 10-node global video network to examine advertising copy and discuss marketing strategy as well as to conduct employee training. JCPenney Company, Inc. uses videoconferencing to resolve problems related to merchandise defects.

Xerox Corp. communicates with customers on its 13-site network, while pharmaceuticals company Marion Merrell Dow, Inc. is pressing for a link to the Federal Drug Administration in hopes of shortening new drug approval time.

GOVERNMENTAL USE

The government also wants to get into the act but is looking to the more traditional travel-saving benefits. Cheryl Mendonsa, director of videoconferencing services at the U.S. House of Representatives, said six committee rooms have been wired for videoconferencing and four hearings that will use videoconferencing are planned between now and November.

Witnesses testifying at hearings will be able to use videoconferencing in lieu of travel, Mendonsa said. "Congress has taken the first step in the technology," she said. "It's only approved for House hearings now, but [videoconferencing] lends itself to other formats such as discussion of base closures or military downsizing."

A videoconferencing manager at a large insurance firm who requested anonymity said executives at his company have been traveling frequently to Washington, D.C. to discuss heath care reform with legislators, but the idea of videoconferencing with Congress instead is appealing.

The federal government hopes the VA videoconferencing trials will ultimately help to hold down health care costs. "We want to start using the technology intelligently so that people only make trips they really have to," said Donald Cordes, deputy director of the Washington Continuing Education Center at the VA. ⧉

AT&T plans to offer new discount deal

OneNet to target large 800, SDN customers.

BY BOB WALLACE

Basking Ridge, N.J.

AT&T last week said it is putting together a service that bundles its domestic and international 800 and Software-Defined Network offerings and gives customers unified billing, discounts and support.

The service, called OneNet, will be targeted at customers that spend at least $600,000 a year on long-distance calling. AT&T plans to file a tariff for OneNet in November and make it generally available sometime next February. The carrier would not detail the service's volume discount plan.

"This is more of a statement of direction that lets our customers know what we are working toward," said Glenn Starr, AT&T's division manager for SDN. "We're doing this because the SDN user group has continually asked us to bundle the services."

Starr said AT&T is already integrating provisioning, maintenance and billing systems to make OneNet possible. The service will cover international 800, Megacom 800 and Readyline 800 services, as well as its SDN, Global SDN and Software-Defined Data Network offerings.

Customers will be able to access the service using switched or dedicated links, but firms that want to use international 800 service will require a separate

See AT&T, *page 6*

Video wares bow at show

AT&T unveils mgmt. system for broadcast TV.

BY ELLEN MESSMER

Washington, D.C.

The International Teleconferencing Association (ITCA) show last week resembled a bustling bazaar as vendors hawked new videoconferencing and business television products.

AT&T introduced its Vistacast Management Service, the first management system for satellite-based video broadcast networks. Vistacast Management Service is a software tool for scheduling satellite time and controlling channel selection on AT&T's Skynet Global Video Service. It also enables users to manage and configure remote video equipment from a central site.

HARRINGTON

Network managers can target broadcast programs to specific audiences or individuals using the multiple channels Skynet provides.

"Because of Skynet's compression feature, Vistacast customers can broadcast a wide variety of programming and dedicate channels for specific uses," said Tim Harrington, director of the global video services product line at AT&T.

The Vistacast software, designed to run on a Sun Microsystems, Inc. workstation, is available for $99 a month.

San Jose, Calif.-based Compression Labs, Inc. (CLI) used the ITCA show to unwrap a low-end multipoint control unit (MCU), which enables users to tie multiple sites into an interactive videoconference. CLI's MultiPoint 2M supports between four and six sites and is priced starting at $49,000. The device, which will ship next month, supports both proprietary CLI algorithms and the CCITT H.320 standard.

The CLI introduction follows on the heels of last month's announcement from Danvers, Mass.-based competitor PictureTel Corp., which said it will ship by the end this month its own low-end MCU, the M-8000, starting at $45,000 for three to six ports. Lexington, Mass-based VideoServer, Inc. is also shipping a low-end bridge, the four-port standards-based Mini 2000, priced at $39,950.

Panasonic Broadcast & Television Systems Co., based in Secaucus, N.J., introduced the VisionSeries 200 roll-about videoconferencing system, which starts at $59,500.

VisionSeries supports the CCITT H.261 coder/decoder standard and operates at speeds between 112K bit/sec and 384K bit/sec.

In addition, Minneapolis-based VideoLabs, Inc. introduced its $595 FlexCam, the first combined camcorder and microphone for use with any desktop videoconferencing system. Mounted on an 18-in. flexible wand that can be adjusted for camera positioning, the FlexCam plugs into the back of a computer with a video board. ⧉

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MESSAGING WARES

Lotus, HP let new E-mail products roll

BY BOB BROWN

Atlanta

Lotus Development Corp. sent cc:Mail users flying at the Electronic Messaging '93 conference here last week with the introduction of wireless electronic mail support.

Hewlett-Packard Co. used the show to unveil a new version of its HP OpenMail system that addresses a sore spot with E-mail — management. The version can be managed by the company's popular OpenView system and features support for a broader list of clients.

MARK ESCHER

KAUFMAN

Lotus' cc:Mail Wireless Pack is software that will be bundled with a wireless modem from Intel Corp. that was developed by Ericsson GE Mobile Communications, Inc. The package will give cc:Mail users access to RAM Mobile Data, Inc.'s wireless radio net.

Workers with mobile computers outfitted with cc:Mail Wireless Pack and a wireless modem will be able to forward mail over the RAM Mobile Data net to a cc:Mail Router 4.0 system on a local-area network, where it would be forwarded like other messages. "There will be virtually no difference using cc:Mail at home or on the road,' said Glenn Kaufman, Lotus' business development manager in the mobile computing group.

The cc:Mail wireless pack will be packaged with the wireless modem and sold exclusively by Intel this summer for an introductory price of $775. The wireless option will be available with cc:Mail Remote for DOS and cc:Mail Mobile for the HP 100LX palmtop personal computer.

Lotus also announced a new version of cc:Mail for Windows and a marketing and development agreement with MCI Communications Corp. to provide added connectivity for cc:Mail.

Lotus' cc:Mail for Windows 2.0 features new rules capabilities that let users instruct the messaging system to take a certain action on a message, such as generating a reply if the recipient is not available immediately.

The cc:Mail for Windows 2.0 server software will cost $495 per user, and a 10-pack of client software will cost $345. The software will ship by July.

Under the agreement with MCI, cc:Mail post offices will be incorporated into the MCI public messaging net, enabling remote and mobile cc:Mail users to exchange messages over a public messaging net without using a gateway. The services will be available by year end.

HP also has pulled HP OpenMail, its flagship E-mail offering, and HP X.400, HP's X.400 transport software, under the Simple Network Management Protocol-based HP OpenView net management system.

Using the Network Node Manager and Operations Center pieces of HP OpenView, net administrators will be able to track connections between messaging servers and server disk space usage, among other things.

The company also announced support for a slew of new clients, including: cc:Mail and Microsoft Corp. Microsoft Mail clients; HP E-mail client software for Apple Computer, Inc. Macintosh computers and SunSoft, Inc. Solaris; as well as Version 2.0 of HP's Windows front-end E-mail software and Version 3.3 of its NewWave Mail client.

HP is providing drivers for the cc:Mail and Microsoft Mail clients, which it said will work with both the new version of HP OpenMail and existing systems.

Other new OpenMail features include automated directory synchronization among OpenMail nodes and tools to help users migrate from IBM's host-based Professional Office System (PROFS) E-mail system to HP OpenMail, said Sridhar Ramanathan, a product marketing manager at HP.

MARK ESCHER

RAMANATHAN

OpenMail's new version will be available in the third quarter for between $30 and $45 per user.

The management application software will be available in the fourth quarter.

Microsoft lays out messaging strategy

BY BOB BROWN

Atlanta

Microsoft Corp.'s next-generation messaging server, dubbed the Enterprise Messaging Server (EMS), was conspicuously absent at the Electronic Messaging '93 conference here last week, so company officials took the opportunity to discuss the product's role in its messaging plans.

EMS, which is a 1988 X.400-based messaging server, will serve as the key platform in Microsoft's electronic messaging- and electronic mail-enabled application strategy. But Microsoft officials acknowledged that the project has gotten off to a slow start, mainly because the operating system on which it will run — Windows NT — is not yet shipping.

EMS, which company officials had hoped to ship in the fall and was originally to be built on OS/2, is now scheduled to be beta-tested later this year, with general availability scheduled for early next year.

"Speaking as someone who uses [EMS] as my mail system, I can tell you it is beta on beta, and that is not something we feel is constructive to show off at this point," said Elaine Sharp, product manager for the server portion of EMS at Microsoft.

"NT has undoubtedly delayed our plans. Until it goes to golden code, we don't know the set of things that could go in NT that we are going to be able to use," she added.

EMS BACKGROUND

The EMS project marks Microsoft's biggest effort to date in E-mail, and it has only been an E-mail competitor since 1991, which was when it acquired Consumers Software, Inc.

"How big is EMS?" Sharp asked. "My manager always says that Bill Gates wakes up every morning and the first thing he thinks about is NT. Then he thinks about EMS."

EMS is a breakthrough mail product for Microsoft in that it is a true client/server system, Sharp said. EMS will support active, intelligent processes on the client and server that will give users more flexibility in setting up and managing their E-mail nets, she said.

Microsoft and most other local-area network E-mail system vendors currently sell shared-file E-mail systems that provide for little interaction — basically, just read and write access, she added.

The fact that EMS is based on NT means that it will be able to take advantage of NT features, such as the logging of every event that takes place, as well as NT's scalability and security features, Sharp said.

"EMS is designed to provide central administration and the other things that host-based E-mail systems do well today, and that will be combined with a nice [graphical user interface] front end," Sharp said.

In addition, EMS will support key X.500 components in order to provide users with centralized directory services.

FINDING A NICHE

Getting EMS to market later than anticipated is frustrating for Sharp, but she said there may be an up side. The holdup has given Microsoft time to reevaluate what needs the product should serve.

The messaging server was first envisioned to replace IBM's Professional Office System (PROFS) and Digital Equipment Corp.'s All-In-1 systems, but the company discovered that it has a large installed base of Microsoft Mail to worry about.

But despite the widely publicized development of EMS, Microsoft Mail has been selling by the thousands every month, said Sharp.

The installed base has persuaded Microsoft to increase efforts to make EMS work as a switch between multiple Microsoft Mail systems, according to Sharp.

Although it is being developed as a complete messaging server, in some nets, EMS will wind up replacing Microsoft Mail's Message Transfer Agent component — dubbed External — to provide routing between Microsoft Mail post offices.

"We don't expect Microsoft Mail customers to switch over to EMS for their mail system overnight, but we do expect to see some of them buy EMS as a monitoring tool for their existing LAN mail networks and then gradually migrate to EMS to gain the benefits of a high-end mail system," Sharp explained.

> **"My manager always says that Bill Gates wakes up every morning and the first thing he thinks about is NT. Then he thinks about EMS," Elaine Sharp said.**

LOOKING AHEAD

Microsoft does not have any plans to curtail development of Microsoft Mail, which will continue to serve the needs of certain users, such as those that do not need NT.

But it will be EMS that Microsoft positions as its core messaging server, a product designed to handle not only E-mail, but also other applications such as work flow, document management and scheduling, according to Sharp.

"That's why we've taken so long and built it from scratch," she said. "We believe you've got to get the infrastructure right first, and then you can build everything else on top of it."

AT&T discount plan

Continued from page 4

local link, Starr said. In addition, customers will be able to use AT&T calling cards and wireless services, which are two access options that have been long supported on the carrier's SDN service.

OneNet will carry the same rates and the same service-specific discounts for 800 and SDN but will offer three-, four- and five-year agreements for volume discounts that Starr said will be larger than those available today with either service.

The highest volume discount for 800 service is 24%, while the highest volume discount for SDN is roughly 32% to 36%, Starr said.

Industry analysts said the service could help AT&T win business from competitors. Customers that use other carriers for one or the other of the services might consolidate that business with AT&T to qualify for the higher discount, said Bob Self, president of Market Dynamics, a New York tariff analysis firm, and author of *Long Distance for Less: The Official Guidebook to Long Distance Telephone Services in the United States.*

AT&T said it will begin beta-testing OneNet in the third quarter. According to Starr, the carrier will use its recently announced Billing Edge personal computer-based software program to provide unified billing for OneNet.

Announced last month, Billing Edge enables users to process call detail and billing information that AT&T provides on a diskette or compact disc (*NW,* May 17, page 2).

Starr said OneNet "is designed to accommodate future services and technology," but he but would not say which services might be added to the offering.

"Look for AT&T to eventually include advanced data services under the OneNet heading," said Mark Langner, a senior analyst with TeleChoice, Inc., a Verona, N.J., consultancy

✆ AT&T: (908) 221-2000.

Comments

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IBM Technology Exchange – Austin

IBM to add DCE functions to its OS/2 LAN Server system

BY CHRISTINE BURNS

Austin, Texas

IBM last week revealed it will ship to beta users in three to six months a version of its OS/2 LAN Server network operating system that incorporates OSF DCE technology, bringing the company one step closer to its goal of implementing DCE across all its major operating systems.

LAN Server will be outfitted with the Distributed Computing Environment security and directory features, giving LAN Server clients access to distributed applications running on machines from multiple vendors. IBM officials are expecting the product to be available six to nine months after it goes to beta users.

IBM's AIX version of the Open Software Foundation, Inc.'s DCE was distributed commercially last December, while DCE for OS/2 in beta and will be generally available within weeks. Officials at a three-day Technical Exchange for the trade press hosted by IBM's Personal Software Products group here said DCE services for DOS and Microsoft Corp. Windows are not far behind those for OS/2.

"We've stated that DCE is going to be across all IBM products from VM and MVS down to the OS/2 and Windows worlds," said John Milburn, manager of IBM's Distributed Systems department. "For LAN Server, we're going to provide an upgrade path so that you can move that low-end file/print sharing into a richer transaction processing environment."

Although IBM has to work out the exact packaging for its LAN Server-based DCE products, Gary Hunt, an IBM advisory programmer and technical lead in LAN Server Development, said new client software will likely be required for full-fledged access to DCE resources. However, IBM will provide gateways that let existing LAN Server clients access DCE-based servers.

Chief among the DCE services LAN Server will support are directory and security features that work hand in hand to help users find and access a myriad of resources, he said. Servers cooperate to share directory data, while the security features, based on Kerberos, form a "cross-domain trust" that makes it easier for users to access resources on any server, regardless of the network domain in which it resides.

The DCE security service uses an authentication process based on a "trusted" third-party security server. A client logs on to the security server just once to receive an encrypted ticket outlining the applications it can access. To access a resource on the net, the client submits the ticket to the server running the application. The server, in turn, passes it to the security server to doublecheck the client's authorization.

"In the world of distributed systems and networking, that's state of the art," Milburn said.

David Passmore, vice president and service director at Gartner Group, Inc., a Stamford, Conn.-based consultancy, noted another advantage Kerberos will provide to LAN Server users.

"You only have to do the single network authentication through a password, and then once you're in, you're given access to all the resources across the network," he said. Currently, users can log on to any server within a given domain using a single password, but multiple logons and passwords are required to access servers in other domains, he said.

LAN Server will also include support for the OSF remote procedure call (RPC), which provides a standardized means for applications to communicate with one another and with other services.

"RPC makes it so that you don't have to be a networking wizard to write a distributed application for a DCE environment," said Rom Kumar, OSF technology manager.

The final DCE technology in the first iteration of the LAN Server products is a time service, which ensures that various system events are synchronized. IBM will also support Transarc Corp.'s Encina transaction processing monitor in LAN Server. Encina provides integrity for distributed transactions, including the ability to back out of a transaction during a failure, and provides a log for all transactions completed.

Transarc has submitted the Encina technology to OSF for consideration as part of DCE.

Further down the road, IBM plans to include DCE's Distributed File System (DFS) resource manager with LAN Server. DFS allows all users on a network to use the same file name when accessing a given file, regardless of where it is stored on the distributed system. ☒

IBM preps enhanced Comm Manager/2

BY PAUL DESMOND

Austin, Texas

IBM last week outlined enhancements to its Communications Manager/2 SNA connectivity software that include new data compression capabilities and improved support for Advanced Program-to-Program Communications sessions.

At a three-day technical exchange for the trade press here, IBM promised to enhance its LAN NetView management system with remote configuration capabilities for DOS and Windows machines as well as support for the Simple Network Management Protocol 2.

Communications Manager/2 runs on OS/2 machines and provides wide-area communications, terminal emulation and Systems Network Architecture gateway functions for OS/2, DOS and Windows clients.

Bob Roth, manager of systems marketing in IBM's Network Access group, said the offering will be enhanced to support full-duplex APPC sessions, as opposed to the half-duplex support it includes now. Half duplex is usually suitable for host communications, but full duplex will position the product to handle applications that require faster and more frequent data transfers between work groups.

Support for data compression will help Communications Manager/2 users conserve wide-area bandwidth and improve performance. Roth said the product will support compression ratios from 2-to-1 to 100-to-1.

The data compression features in Communications Manager/2 will work with an identical feature in the latest releases of VTAM 3.4 and 4.1, improving throughput for 3270 traffic by 30%, according to IBM. Currently, VTAM data compression works only with personal computers running IBM's

See Comm Manager, *page 61*

IBM Technology Exchange – Austin

APPN

IBM, others to address APPN implementation concerns

BY MICHAEL COONEY

Raleigh, N.C.

IBM and its third-party followers this week will outline products and services designed to address nagging concerns about implementing APPN technology, including conformance testing, licensing fees and Data Link Switching (DLSw) definitions.

The third-party vendors will join IBM here at its annual Platform Developers Conference, where vendors of Advanced Program-to-Program Communications and Advanced Peer-to-Peer Networking products will meet to discuss future directions.

While the four-day conference will cover everything from how to implement IBM's Common Programming Interface for Communications to building APPN End Nodes (EN), many vendors said some important new issues will rise to the forefront.

"[IBM] needs to better define features such as how data will flow between two Network Nodes supporting dLR, but at least it's now being made public," said Cisco Systems' Wayne Clarke.

The first is conformance testing for products that implement APPN, IBM's Systems Network Architecture peer-to-peer net technology that consists of Network Nodes (NN), which support routing and directory functions used by attached ENs.

"Vendors are interested in testing Network Node implementations now," said Wayne Clarke, manager of SNA development for Cisco Systems, Inc. "IBM in the past has charged high fees to perform interoperability testing, so we want to be able to manage and control testing ourselves more economically."

To date, there is no way to test NN implementations and only one firm — Applied Computer Technology (ACT) of Garland, Texas — offering EN interoperability testing. IBM has issued a statement of direction saying it will provide APPN testing by the middle of 1994.

"We expect to form a [special interest group] on this because so many vendors and users want it," said Burt Gearhart, president of ACT. "The SIG will let multiple vendors, not just IBM, set the interoperability parameters for APPN products."

IBM's Marsha Peters, APPN lead architect, said the company will soon publish documents so vendors can test their own products.

IBM will also further detail its APPN patent licensing agreement, as it promised it would at the APPN Implementors Workshop in April. At that workshop, IBM dropped what many APPN developers considered a bombshell, saying EN implementations would have to be licensed with the $25,000 APPN Technology Offering package.

Vendors were dismayed at that news because EN technology is already published and in the public domain and EN products have been developed and implemented by many vendors free of charge.

IBM has indicated it might offer a less expensive technology package for EN and Low Entry Networking, which is a PU 2.1 node that offers slightly less functionality than an EN.

Peters said IBM will discuss the fees at next week's meeting but declined to give details.

IBM will also deliver the first technical specifications for dependent LU Requestor (dLR) support. The dLR component, the client portion of IBM's dependent LU Server (dLS)/Requestor technology, lets 3270 devices participate fully in APPN nets. It resides in an APPN NN and works by encapsulating 3270 control data in an LU 6.2 session and sending it over the APPN net to an IBM mainframe containing the dLS function.

Support for dLS will be included in VTAM 4.2, which IBM is expected to announce late this year.

Peters said vendors will have the opportunity to review the specification and make recommendations for additional features that could be added to dLR.

Once the features have been settled upon, IBM will submit dLR to the Internet Engineering Task Force (IETF), probably by the end of the year.

SIGNIFICANT PIECE

According to Clarke, "dLR is a significant piece of APPN because it is [the technology that] many router vendors will use to bring older 3270 devices into APPN. [IBM] needs to better define features such as how data will flow between two Network Nodes supporting dLR, but at least it's now being made public."

The conference will also feature the first formal meeting of the DLSw SIG, formed last April.

Twelve vendors, including Cisco and Proteon, Inc., make up the DLSw SIG. The SIG will work to make recommendations to the IETF, where DLSw is currently an information request for comment (RFC).

DLS is IBM's technology for routing SNA and Network Basic I/O System traffic over Transmission Control Protocol/Internet Protocol backbones. Cisco formed the SIG to develop DLSw more fully after DLSw became an RFC.

Peters said the SIG will devote its attention to defining a few key technologies currently missing from DLSw, including flow/congestion control, PU 2.1 support and common directory support. ☒

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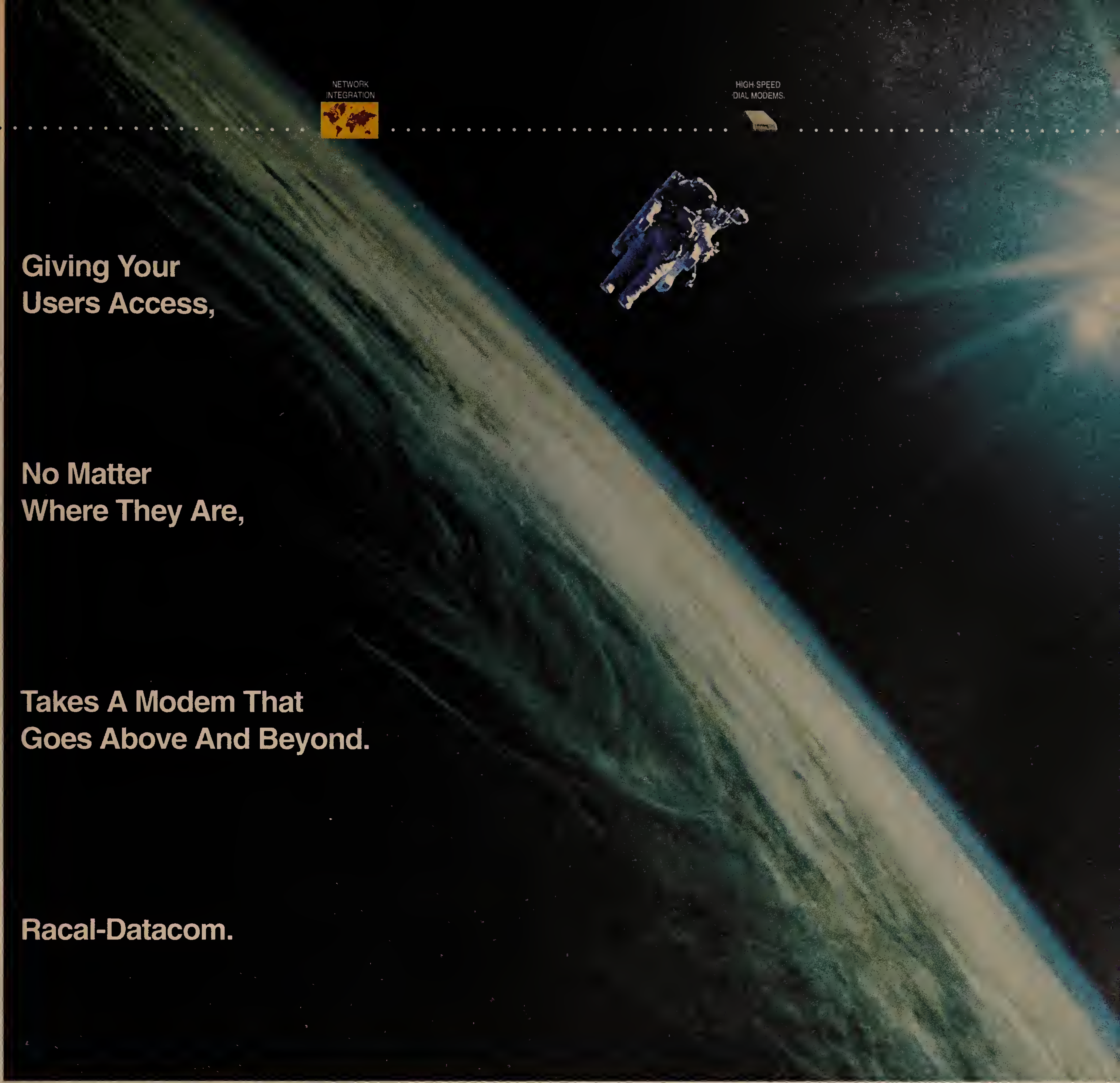
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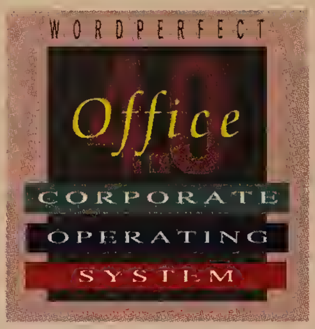

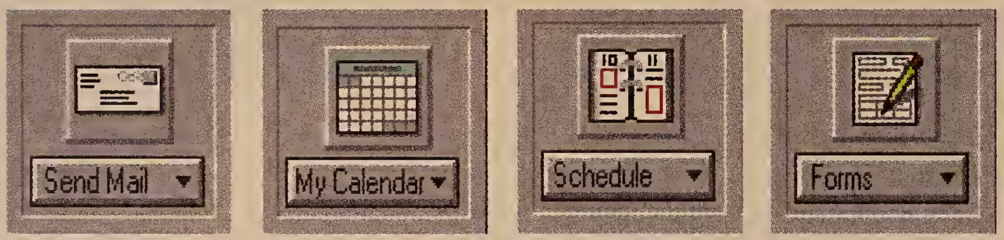

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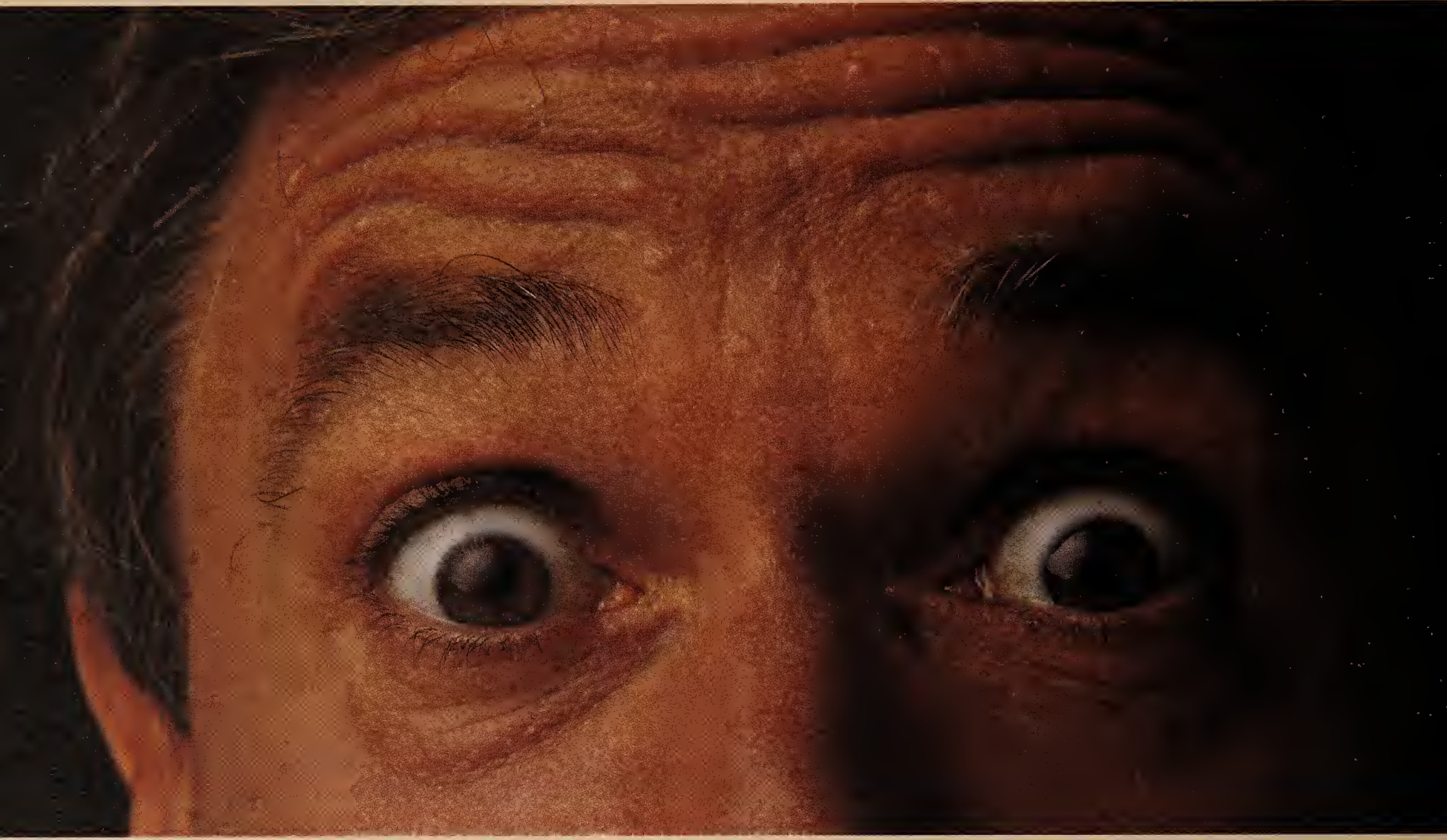

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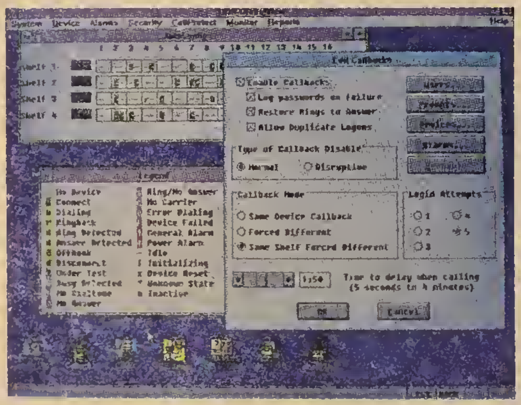

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BRIEFS

Retix last week began shipping Release 2.0 software for its RouterXchange 7000 (RX 7000) multiprotocol router that includes data compression and X.25 support. Based on the Lempel-Ziv algorithm known as LZ1, the Retix implementation provides an average data compression ratio of 4-to-1 across a wide-area link. Release 2.0 also provides support for bridging and routing over X.25 networks.

Data compression and X.25 are available now, and are included on all RX 7000 models at no extra charge. Free upgrades for current customers are available through Retix's Customer Support Department.

Retix: (800) 255-2333 or (310) 828-3400.

U.S. Robotics, Inc. has announced two intelligent hubs that combine X.25, modem, terminal server, data service unit/channel service unit and network interface functions into a single chassis. The Enterprise Network Hub and the Transaction Processing Hub have the same hardware architecture but come with software optimized for specific vertical markets.

The Enterprise Network Hub is optimized for data-intensive applications such as file transfers and lets users aggregate dial-up traffic from multiple remote sites onto T-1 lines and route it through a packet-switched network to a host at a central site.

The Transaction Processing Hub is optimized for handling a high volume of small transactions. It links directly to a local carrier service and routes traffic via T-1 lines to local-area network interfaces for transaction processing applications such as point of sale or credit card authorization.

Both chassis-based hubs — which are designed to support hybrid analog and digital networks — are equipped with 17 slots, 12 of which can house four-port modem cards for a total of 48 modem ports. One slot is used for a hub network management card while the other four support wide-area interfaces at speeds of up to T-1 and any combination of gateway interfaces. Both hubs are managed by a Simple Network Management Protocol-based network management system.

The hubs today support T-1 and token ring and RS-232 interfaces. U.S. Robotics said X.25 packet assembler/disassembler support will be added next quarter, while frame relay, Integrated Services Digital Network and Ethernet interfaces will be added early next year. Bridge/routing and Switched Multimegabit Data Service capabilities will be added in mid- to late-1994.

The Enterprise Network Hub and Transaction Processing Hub range in price from $25,000 to $60,000, depending upon configuration and number of interfaces supported. Both are available now.

U.S. Robotics: (800) 342-5877.

Develcon Electronics, Inc. has announced its Model-200 Remote Token-Ring Bridge with a 6-to-1 data compression capabil-

See Briefs, *page 17*

DEC execs lay out future plans at show

Banking on key technologies to fuel rebound.

BY JIM DUFFY

Atlanta

Digital Equipment Corp. is counting on emerging technologies such as wireless and multimedia, and an emphasis on client/server computing and LAN internetworking to fuel the company's rebound, DEC executives told users at the Digital Equipment Computer Users Society (DECUS) meeting here.

DEC President and Chief Executive Officer Robert Palmer and Laurence Walker, vice president of DEC's Networks Engineering group, came to convince users that their principal vendor is around for the long haul and that DEC plans to be at the forefront of a rapidly changing industry.

DEC lost $2.8 billion in 1992 and about $365 million in the first nine months of fiscal 1993, a period which ended March 31.

WALKER
DEC

Walker oversees a new group, called Emerging Technologies, that was formed after a recent restructuring of DEC's networking operations. The group is chartered to pinpoint revenue opportunities in cable TV, mobile computing and multimedia, and quickly bring to market new products.

"Emerging Technologies is focused on integrating people in ways we haven't been able to integrate them before," Walker said. "We decided very explicitly to make it a discrete, separate and fire-walled group so we have the resources focused on getting [products] out to market quickly."

DEC is also looking to the Emerging Technologies group to restore some of the innovation that has slipped away from the company in the recent past, Walker said.

"We think it's a fair criticism that our rate of innovation hasn't been as high in the last five years as it was in the five or 10 years before," Walker said. "Focusing this group not so much on creating but rather developing and bringing to market new technologies is a direct response to that."

DEC isn't wasting any time. The company recently announced products that allow users to access applications on corporate Transmission Control Protocol/Internet Protocol networks from mobile comput-

See DEC, *page 17*

ROUTERS

HP offers lower cost multiprotocol router

BY SKIP MACASKILL

Palo Alto, Calif.

Hewlett-Packard Co. is hoping the key to the router market may just be pricing.

The company last week announced two local multiprotocol routers that it claims cost nearly 60% less than similarly configured products from players such as Cisco Systems, Inc. and Wellfleet Communications, Inc.

In a related announcement, the firm said it will reduce prices on its existing EtherTwist bridges and routers by as much as 24%.

"Small and midsize users who need routing to provide better security and performance only want to buy what they need," said John Vega, product marketing engineer for routers at HP. "There's no reason why the user should have to pay an arm and a leg for that functionality."

The new routers will include the HP 27290A Backbone Router (BR), which comes with four Ethernet interfaces and a Fiber Distributed Data Interface port, and the HP 27287A Local Router (LR), which offers four Ethernet interfaces.

Both support the Transmission Control Protocol/Internet Protocol, Apple Computer, Inc.'s AppleTalk II, Digital Equipment Corp.'s DECnet IV, Novell, Inc.'s Internetwork Packet Exchange (IPX) and Xerox Corp.'s Xerox Network Systems protocols, as well as the Router Information Protocol and Open Shortest Path First routing protocols.

The routers are powered by 25-MHz Motorola, Inc. 68040 microprocessors, support the Spanning Tree Protocol (STP) and filter and forward at Ethernet's wire-speed rate of 14,880 packet/sec. When used as a bridge supporting SPT, the routers have an aggregate throughput of 20,000 packet/sec.

The BR, which supports transparent bridging between FDDI segments and translation between Ethernet and FDDI networks, can be used to connect to an FDDI backbone. Multiple BRs can be linked via the FDDI port to support Ethernet traffic over an FDDI backbone.

HP is targeting the routers at users with low to medium growth needs and small companies with 300 to 500 end nodes in a pure Ethernet environment. The products will also fit Ethernet departmental work groups that need segmentation for security, and in collapsed backbone environments.

Available next month, the BR costs $12,500, 29% less than a similarly configured Cisco 4000, 42% lower than a 3Com Corp. NetBuilder II and 58% less than the Wellfleet Link Node (LN).

The LR, which will also be available next month, costs $7,500, which is 26% less than a similarly configured 4000, 46% lower than the NetBuilder II and 58% less than the Wellfleet LN. ◼

✆HP: (800) 752-0900.

SunConnect upgrades SunLink OSI

BY CHRISTINE BURNS

Washington, D.C.

SunConnect has announced a new version of its Open Systems Interconnection platform and a suite of new applications that comply with Version 2 of the Government OSI Profile (GOSIP).

SunLink OSI 8.0, which supports a full set of OSI protocols, has been upgraded to run on Sun Microsystems, Inc.'s Solaris 2.X and later releases of the Unix-based multi-threading operating system. This allows applications to process more than one message concurrently.

Jean-Pierre Baudouin, director of product development at SunConnect, said the applications are shipped with an Open Windows-based graphical user interface (GUI), which significantly reduces installation time. The GUI uses pop-up screens to guide users through the configuration process.

SunLink OSI 8.0 has been upgraded to run on Sun Microsystems, Inc.'s Solaris 2.X.

"Many companies make products which are GOSIP-compliant with the frame of mind that it is something that they were forced to do or otherwise their products would be barred from government markets," said Baudouin.

"We came up with a product that is GOSIP-compliant but we also took the time to make it user-oriented," he added.

OSI 8.0 APPLICATIONS

The new applications include SunLink X.400, SunLink Common Management Information Protocol

See SunConnect, *page 17*

Announcing the first network printer

Operating System	*Topology*
Novell Netware	**Ethernet/802.3*
	Token Ring (4/16 Mbps)
Microsoft® LAN Manager	**802.3*
	Token Ring (4/16Mbps)
Windows for Workgroups	**802.3*
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Windows NT	**802.3*
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IBM LAN Server	**802.3*
	Token Ring (4/16 Mbps)
AppleTalk	**LocalTalk*
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Multiple environments are no longer worlds apart. Even if you have Novell Netware on one network, HP-UX on another and EtherTalk on a third, the new HP LaserJet 4Si MX printer easily connects across platforms. Automatically.

The HP LaserJet 4Si MX printer comes out-of-the-box preconfigured for multiple environments. There's nothing more to do than plug-and-play. All interfaces are simultaneously hot, making switching so seamless, end-users won't even notice.

What's more, HP's LaserJet 4Si MX printer is ready to handle whatever needs come down the

*Standard in the HP LaserJet 4SI MX printer. **For operating HP-UX, SunOS or Solaris, a one-time purchase of $199 in configuration software is required. Adobe and PostScript are trademarks of Adobe Systems Inc. which may be registered in certain jurisdictions. Microsoft is a U.S. registered trademark of Microsoft Corporation. UNIX is a registered trademark of UNIX System Laboratories Inc. in the U.S.A. and other countries. †In Canada call 1-800-387-3867, Ext. 7299.

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that adapts to multiple environments.

pike. More operating systems? No problem. As your network system continues to evolve, the capabilities of this printer are no longer just impressive. They're indispensable.

The HP LaserJet 4Si MX printer is loaded with features that define state-of-the-art. HP's enhanced PCL5 and genuine PostScript™ Level 2 software from Adobe™ come standard. Printer environments are saved while switching. Setup is a cinch with network software utilities and drivers included in the box. And, if you need any reassurance about trouble-free operation, you have it in our Simple Network Management Protocol (SNMP) support.

At 17 ppm, this is the fastest LaserJet ever, with I/Os and RISC-based formatter capabilities matched to support its speed. It delivers impeccable 600 dpi print quality—thanks to HP's microfine toner and Resolution Enhancement technology. Plus, it comes standard with two 500 sheet input trays.

But what if you don't need the full capabilities of the HP LaserJet 4Si MX printer right away? HP offers another printer that's probably a perfect fit. The HP LaserJet 4Si printer delivers the identical 17 ppm performance and superb 600 dpi print quality. It also has room to grow. The two MIO expansion slots let you add HP JetDirect network interface or third party cards. And you can add on Adobe's genuine PostScript Level 2 software and SIMM memory modules, as you need them.

To find out more about the multiple-network HP LaserJet 4Si MX printer and the upgradable HP LaserJet 4Si printer just call 1-800-LASERJET, Ext. 7299.† Capabilities this advanced make a world of difference—in any environment.

HEWLETT
PACKARD

Sync Research beefs up its Ethernet support

BY MAUREEN MOLLOY

Irvine, Calif.

Sync Research, Inc. last week announced a low-end version of its Sync Network Access Controller/Ethernet Converter (SNAC/ENC), which allows SNA data to be mixed with LAN traffic on wide-area internetworks.

The company's miniSNAC/ENC is a smaller version of the SNAC/ENC, which converts Synchronous Data Link Control packets into 802.2 Logical Link Control 2 frames. This lets users attach devices such as cluster controllers to Ethernet local-area networks so Systems Network Architecture data can be sent to an IBM host using the same multiprotocol routers that handle LAN traffic. This eliminates the need for multiple low-speed, wide-area SDLC lines.

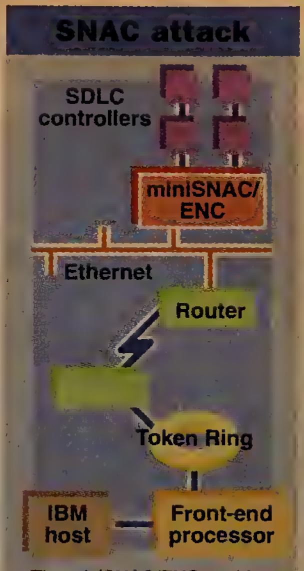
The miniSNAC/ENC comes in two- and four-port versions, and supports a maximum of 16 physical units, while SNAC/ENC supports as many as 16 ports and 60 physical units.

Sync also offers a product that links SNA devices to token-ring nets. Dick Thunen, Sync's manager of SNAC products, said token ring is the dominant backbone net at IBM host sites but many users have Ethernet LANs and 3270 terminals in remote offices. The miniSNAC/ENC is targeted at those users.

The miniSNAC/ENC supports any PU Type 1 or 2 device with an SDLC interface. It sits between cluster controllers and the Ethernet LAN, and can attach to the LAN at speeds up to 64K bit/sec.

The unit communicates with attached cluster controllers at speeds up to 19.2K bit/sec and uses an internal IEEE 802.3-compatible adapter for connecting SDLC, Binary Synchronous Communications and asynchronous devices to the Ethernet.

The miniSNAC/ENC can be managed by both IBM's NetView and Simple Network Management Protocol-based management systems. The miniSNAC/ENC will be available in October. Pricing starts at $3,500 for two RS-232 SDLC lines.



The miniSNAC/ENC enables SNA controllers to communicate with IBM hosts over 10M bit/sec Ethernet networks.

SOURCE: SYNC RESEARCH, INC., IRVINE, CALIF.
GRAPHIC BY SUSAN J. CHAMPENY

IBM, HP users get improved E-net mgmt.

BY MICHAEL COONEY

Campbell, Calif.

Users of IBM's NetView/6000 and Hewlett-Packard Co.'s OpenView can now get more detailed management information from Ethernet local-area networks, thanks to Network Application Technology, Inc. (NAT).

NAT last week expanded its Multi-Vendor Support Series (MVSS) software to run on the IBM and HP platforms, which will let users get a better handle on response time and traffic flow across Ethernets.

Until now, MVSS worked only with Sun Microsystems, Inc.'s SunNet Manager and Digital Equipment Corp.'s Polycenter SNMP Manager 3000.

MVSS is a Simple Network Management Protocol-based application that gathers information from NAT Ethermeter probes on Ethernet LAN segments. Ethermeter probes are stand-alone SNMP-based Ethernet traffic monitors, and MVSS can support as many Ethermeters as the IBM or HP system processors will allow.

Data gathered by the remote Ethermeters is sent back to MVSS' Remote Monitoring Management Information Base for storage and display via the central management system's color console.

Network managers can use the data to analyze network performance, diagnose problems and manage data traffic from remote Ethernet LANs, said Kevin Amazon, vice president of business development for NAT.

MVSS for IBM and HP platforms will be available by the end of the month for $1,995. Ethermeters are available now and are priced at $1,495.

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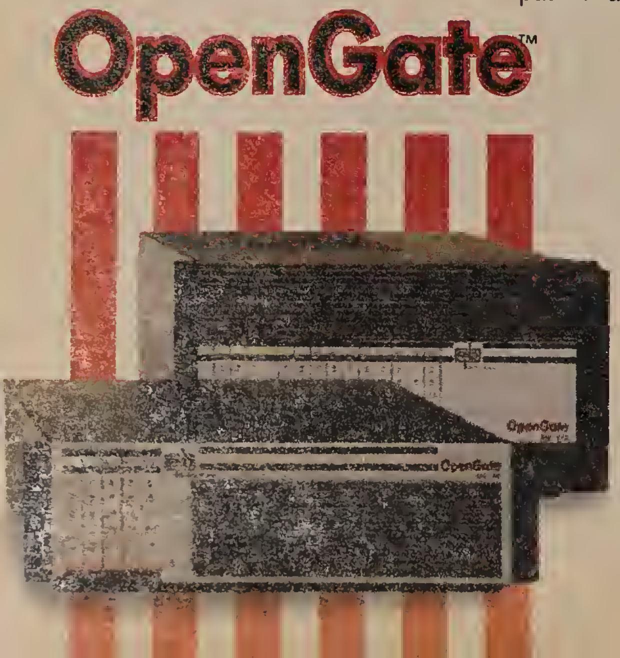

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NHL employs client/server applications

BY MICHAEL COONEY

Toronto

With the help of an AS/400-based network and client/server multimedia applications, the National Hockey League hopes to bring the sport to life for thousands of fans expected to visit its version of Valhalla in the coming year.

"We wanted to build a network that could support advanced image and multimedia applications that would become our showcase," said Jeff Denomme, director of finance and operations for the Hall of Fame. "We needed a network and a server fast and big enough to handle the interactive applications we wanted to build."

What Hall of Fame organizers decided to install was an Application System/400 Model 45 as the host to a 16M bit/sec IBM Token-Ring Network local-area network. The network links 30 Personal System/2s and about 10 PS/1s, along with a number of 5250 terminals, and supports a number of applications, from point of sale, financial and administrative to electronic mail and multimedia.

"We evaluated a number of vendors, including Commodore and Unisys, but none could offer the complete solution IBM did," said Denomme. "Plus, NHL headquarters and almost all of the teams in the league run AS/400s, so we wanted that compatibility."

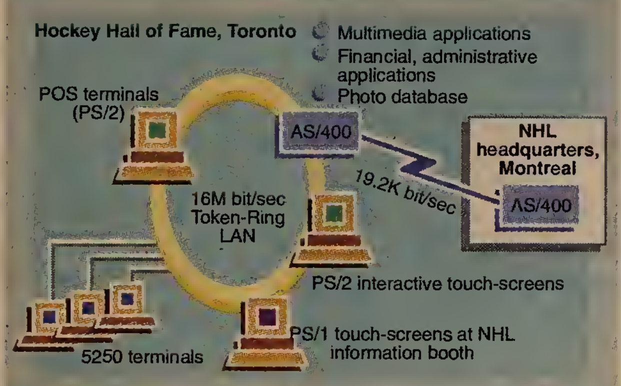
The multimedia applications are the stars, Denomme said. Visitors can use touch screens on the PS/1s to activate video footage of their favorite players stored on a database running on the AS/400.

The Hall of Fame also houses a 6-ton electronic information scoreboard where fans can gather everything from NHL statistics and game summaries to hockey news. The AS/400 runs the scoreboard and receives information from an AS/400 at NHL headquarters in Montreal via a 19.6K bit/sec line.

The Hall of Fame net also supports on-line training, coaching and officiating videos. Visitors are encouraged to bring photos of their local hockey players which can be scanned into the AS/400 and stored.

On the business side of the Hall of Fame, administrative users can bring a report, graphic or spreadsheet on-screen simultaneously and have the information updated in real time by data on the AS/400. Before, none of the Hall of Fame's computers were connected and data could not be shared easily, Denomme said. Now, administrators can update financial records and run their businesses more efficiently.

Hockey Hall of Fame networking rink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AS/400
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16M bit/sec Token-Ring LAN
PS/2 interactive touch-screens
PS/1 touch-screens at NHL information booth
5250 terminals

In order to bring the game to life, the National Hockey League installed highly interactive multimedia applications on an AS/400 and Token-Ring LAN at its new Hockey Hall of Fame facility.

SOURCE: HOCKEY HALL OF FAME

Wellfleet ports Site Manager to systems

Net mgmt. app to run on IBM, HP platforms.

BY MAUREEN MOLLOY

Billerica, Mass.

Wellfleet Communications, Inc. said last week that its Site Manager SNMP-based management system now works on a wider array of platforms.

Site Manager will now operate on IBM's RS/6000 workstations as well as Hewlett-Packard Co.'s HP/9000 workstations. Previously, the system only ran on DOS-based 386 or 486 personal computers running Windows and on Sun Microsystems, Inc. SPARCstations running X Window System, OpenWindows or Motif.

Site Manager uses the Simple Network Management Protocol and enables an administrator to monitor, configure and control Wellfleet routers. The product uses SNMP's GET and SET commands to offer a greater level of control over Wellfleet gear.

Currently, most bridges and routers are equipped with SNMP agents that communicate with an SNMP manager using only the GET command. This enables the agent to respond to queries from a management station but does not support complex commands for controlling devices, such as making configuration changes.

Using Site Manager, a net manager can monitor the Wellfleet router to determine if it is having problems and then issue commands to resolve them. The SET functionality also lets managers change default values and routing tables, or set filters and performance parameters.

Site Manager will be available on the RS/6000 and HP/9000 by the first quarter of next year and will cost between $100 and $200.

☎Wellfleet: (508) 670-8888.

DEC future

Continued from page 13

ers over wireless nets (*NW*, June 7, page 4). And last month, DEC brought out a product, called the Digital Channel, that allows users to bridge Ethernet LANs over cable TV networks to create a 10M bit/sec metropolitan-area Ethernet network. That product is made by LANCity, the Andover, Mass., company that manufactures the Digital Channel.

For his part, Palmer said DEC is looking to capitalize on the industry trends of downsizing, LAN interconnection and open computing.

"You can't remain firmly planted in a proprietary model with the cost structure that engenders and compete in an open systems environment," Palmer said. "We decided we're going to be a leader in open systems and multivendor products and solutions, and we're going to be competitive."

Client/server computing is "a major driver" at DEC because it's a style of computing that DEC pioneered, Palmer said. He added that the company is intent on investing heavily in client/server computing.

Palmer also said that integrating LANs into enterprisewide networks is a tremendous opportunity for the company and an area where DEC can maintain leadership, although he did not expand on that.

Users said DEC seems to be moving in the right direction but question whether the strategy is relevant to all product lines.

The new technology and client/server initiatives are "being driven at different levels," said Thomas Lee, group leader for process control at International Paper Co. in Mobile, Ala. "There's confusion as to what happens with certain [older] products. There's still a lot of confusion over which are going to fall out which way."

BRIEFS

Continued from page 13

ity, which enables users to boost throughput without adding bandwidth. Two versions are available: one that supports speeds up to 512K bit/sec and another that provides compression of up to T-1 speeds on a 128K bit/sec leased line. Pricing for the Model-200 bridge starts at $3,650.

Develcon: (800) 423-9210.

Newport Systems Solutions, Inc. (NSS) last week announced that its personal computer-based LAN2LAN/Multiprotocol Router (MPR) sustains a packet-forwarding speed of 14,728 packet/sec for 64-byte packets. The results were obtained when the router was used with **3Com Corp.'s** EtherLink II Parallel Tasking Ethernet adapter. When 512-byte packets are used, the LAN2LAN/MPR has a packet-forwarding speed of 2,348 packet/sec. Both figures are nearly 100% of Ethernet's theoretical maximum speed.

NSS: (800) 368-6533.

StrataCom, Inc. and communications chipset manufacturer **PMC-Sierra (PMC)** last week announced a licensing agreement whereby PMC will build and distribute two Asynchronous Transfer Mode (ATM) chips that incorporate technology developed and patented by StrataCom.

The agreement covers two StrataCom ATM patents which describe algorithms for delineating cells without adding overhead. PMC employs these algorithms in its ATM Physical Layer Protocol Processor chip and in its recently announced Saturn User Network interface chip. Under the agreement, purchasers can use PMC's chips without having to pay additional royalties to StrataCom.

StrataCom: (408) 294-7600; PMC-Sierra (604) 668-7348.

Telco Systems Network Access Corp. last week announced the Access30 intelligent, multiport data service unit/channel service unit that provides connectivity to domestic and international T-1 and fractional T-1 services.

The new DSU/CSU resides on the customer's premises and links geographically dispersed applications such as local-area network, facsimile and private automatic branch exchange interconnections, networked computer-aided design and manufacturing, videoconferencing and integrated voice and data communications.

The Access30's data terminal equipment ports function at speeds of up to T-1 and support V.35, RS-449 and RS-530 interfaces. The Access30 can be managed via a VT-100 terminal or an in-band communications channel. It is available now in two- and four-port versions and carries a five-year warranty. Pricing starts at $3,695.

Telco Systems: (510) 490-3111.

IBM last week announced that it had nearly doubled its multivendor NetView/6000 Association's membership to 63 since February. The NetView/6000 Association is made up of third-party software vendors writing applications on top of IBM's NetView/6000 net management platform.

New members include Madge Networks, Inc., which will be writing an application that will let the NetView/6000 platform manage Madge Networks' SmartCAU intelligent wiring concentrator and its SmartRingBridge source route bridge. LANNET Data Communications, Ltd. and LanOptics, Ltd. also announced they would provide a NetView/6000 application to monitor their local-area network devices.

SunConnect

Continued from page 13

(CMIP), SunLink File Transfer, Access and Management (FTAM) and SunLink Visual Terminal (VT), all of which can run concurrently on the same server platform.

SunLink X.400 meets the 1988 CCITT X.400 message handling standard and makes it possible to connect Unix and Sun electronic mail users to E-mail networks through an SMTP/X.400 gateway. The gateway includes a set of application program interfaces (API) for mail, classical messaging applications and electronic data interchange.

SunLink CMIP can be used to develop OSI-network management applications. SunLink CMIP also supports SunNet Manager, SunConnect's own management console, to allow companies such as local and long-distance carriers to manage their networks from SPARC workstations.

Through an API, SunLink FTAM gives users direct access to FTAM protocol initiator/responder services, which is said to facilitate the process of opening files between networks. SunLink VT supports the International Standards Organization VT and lets local clients establish interactive connections to remote systems across an OSI net.

The price of SunLink OSI 8.0 is $1,995. The pricing for the communication products is as follows: SunLink X.400, $5,995; SunLink CMIP, $4,995; SunLink FTAM, $1995; and SunLink VT, $1,995.

☎SunConnect: (800) 241-2669.

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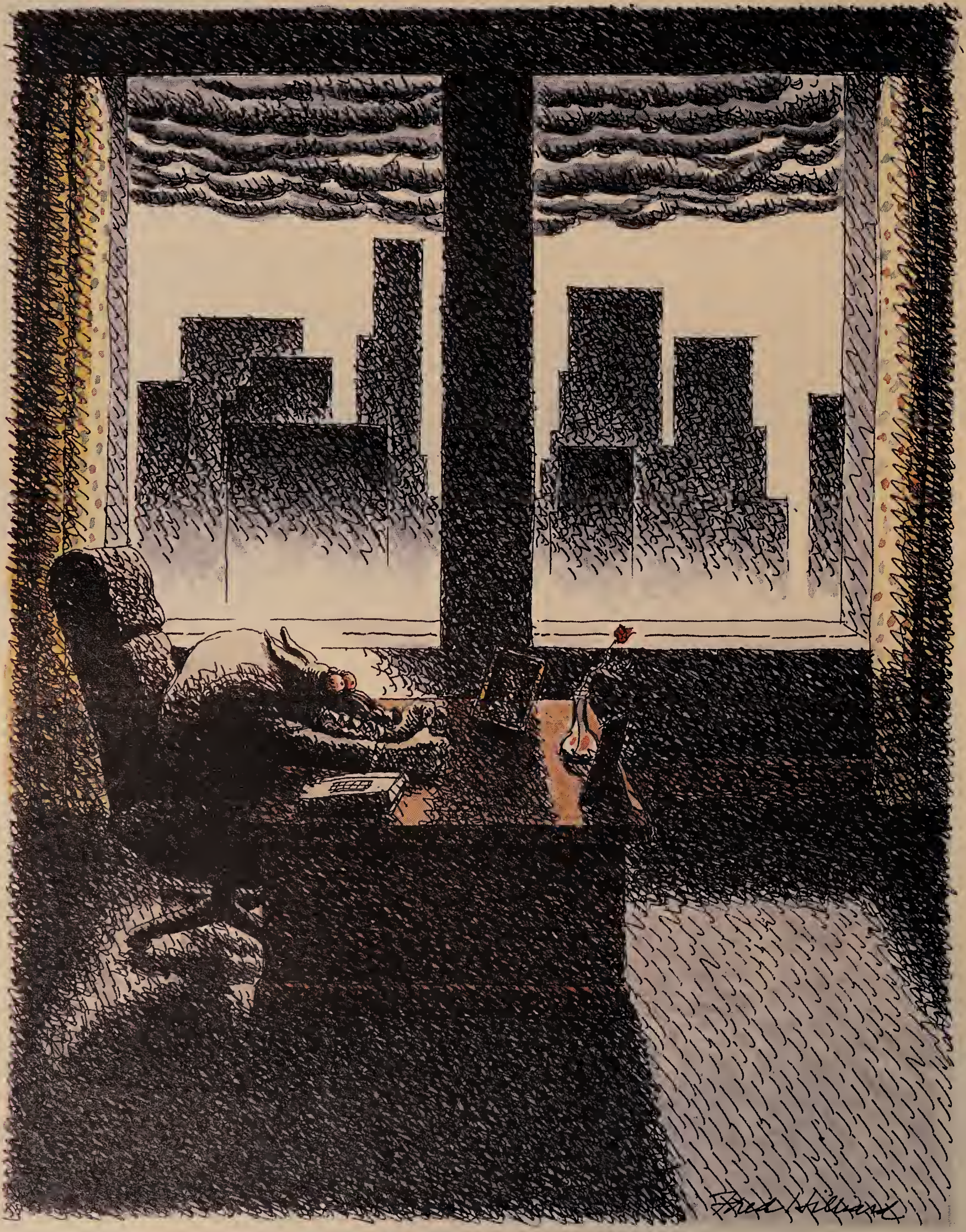

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LOCAL NETWORKS

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BRIEFS

NBase Switch Communications, Inc. last week rolled out two Ethernet hubs, including the NH 50, which is a 16-port 10Base-T device priced at $425 — or less than $27 per port. As many as five NH 50s can be cascaded together to support up to 80 Ethernet users.

The SH 500 is a 12-slot 10Base-T hub that can support as many as 132 Ethernet users via attachment unit interface, BNC, fiber-optic or twisted-pair connections across four 10M bit/sec Ethernet backplanes. The hub supports redundant power supplies, hot-swappable modules and bridging. The modules can be configured as independent local-area networks and moved via the company's NetVision Simple Network Management Protocol net management package to any backplane segment. SH 500 prices start at $1,825 for the chassis and power supply, while the hub modules range in price from $1,049 to $1,895. All products are available now.

NBase: (800) 858-7815.

Ungermann-Bass, Inc. last week announced that the Securities Industry Automation Corp. (SIAC), which provides information technology services to the New York and American stock exchanges, has selected UB to provide network management and monitoring systems. Under terms of the deal, UB will supply its NetDirector net management system with ProTools, Inc.'s Foundation Manager and Cornerstone Probe desktop monitoring and analysis applications layered on top. The management system will support out-of-band management capabilities, allowing SIAC net managers to get management information even when a primary network link fails.

TGV, Inc. has announced a revised licensing plan for its MultiWare Server software, which enables any OpenVMS system to provide Novell, Inc. NetWare-compatible file and print services. It is now being offered at $900 for a five-user license; $1,200 for 10 users; $1,700 for 20 users; $3,200 for 50 users; $5,200 for 100 users; and $10,400 for 250 users.

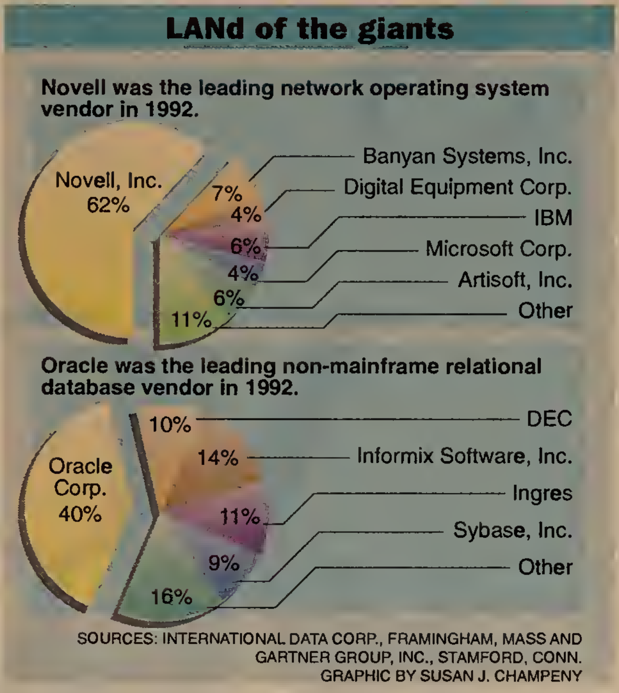
TGV: (800) 848-3440.

Mux Lab has rolled out the TokenEase Smart MSAU, an intelligent 16-port token-ring hub that offers an automatic loop-back feature, which preserves the integrity of the ring in the event of a break in the main ring. As many as 256 units may be daisy-chained together and controlled through Mux Lab's TokenEase Smart software, which is included with each unit. Available now, the hub costs $1,750.

Mux Lab: (800) 361-1965.

Frontier Software Development, Inc. has announced the NETscout family of distributed Remote Monitoring (RMON) software geared toward hub, bridge and router platforms. Supporting both the token-ring and Ethernet RMON groups, the RMON agents may reside on a variety of processors, including Reduced

See **Briefs**, *page 23*



SOURCES: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS AND GARTNER GROUP, INC., STAMFORD, CONN.
GRAPHIC BY SUSAN J. CHAMPENY

Novell, Oracle ink OracleWare database deal

BY CARYN GILLOOLY

San Francisco

Look out Microsoft and Sybase, here comes OracleWare.

As expected, Oracle Corp. and Novell, Inc. last week announced a joint technology, distribution and service agreement designed to bring their products closer together (*NW*, May 31, page 1). The result: a new product line dubbed OracleWare.

OracleWare brings the Oracle7 database management system, Oracle Office electronic mail, calendaring and scheduling software together with various Novell offerings.

OracleWare System NetWare 3.X Edition combines Oracle products with NetWare 3.X, OracleWare System NetWare 4.0 combines them with NetWare 4.0,

See **OracleWare**, *page 22*

Intel showcases eight networking products

Firm offers enhanced LAN management and virus protection products, new backup option.

BY FREDRIC PAUL

American Fork, Utah

Intel Corp. last week introduced a laundry list of networking products as part of its Smart Network Services strategy, designed to integrate net management functions.

The new products include LANDesk Manager 1.02 software, LANDesk SNMP Gateway 1.5, LANDesk Virus Protect software, three new StorageExpress backup servers, LanspoolExpress Print Accelerator and Network Equipment Technologies, Inc. SatisFAXtion 2.0 software.

They are designed to consolidate standard management tasks with virus detection, backup and system administration. "Intel's really into standards," said Christopher Thomas, manager of core technology for Intel's Network Management Operations.

Version 1.02 of LANDesk Manager, a central console for managing local-area networks, is primarily a maintenance upgrade. It improves performance in net monitoring functions and offers easier installation. As the integration point for Smart Network Services, it handles the alert, control and notification features of the new SNMP Gateway 1.5, Virus Protect and StorageExpress products.

This fall, Intel plans to release the next generation of LANDesk Manager, which will be dubbed Version 1.5 or 2.0, that will integrate even more features. This version, originally scheduled to be released now, will feature a new task management interface to provide scripting for simultaneous control of multiple LANDesk services, including printing and faxing, and today's gateway, virus and backup functions.

Available now for Novell, Inc. NetWare 3.11 and later, LANDesk Manager costs $995 per server. The new version will be more expensive, but purchasers of Version 1.02 will receive free upgrades.

The components available now include SNMP Gateway 1.5, which gathers Simple Network Management Protocol data from LAN-attached desktop machines, including processor type and memory. To minimize network traffic and personal computer overhead, there is no SNMP agent installed on the PC. Instead, a single agent on the NetWare server sends proxies to as many as 250 clients.

LANDesk SNMP Gateway 1.5 is available now for $795 per server. LANDesk Virus Protect integrates the virus protection of LANProtect, an existing virus detection package from Intel, with central management from a LANDesk console. Users no longer have to attach to each server individually during their search for viruses, and an Intel bulletin board system lets users download new virus patterns and automatically

See **Intel**, *page 25*

Bytex unveils RMON tools for remote Ethernets, token rings

BY SKIP MACASKILL

Westborough, Mass.

To ease the burden of managing remote networks, Bytex Corp. last week rolled out a Remote Monitoring (RMON) tool for distributed Ethernet and token-ring environments.

Dubbed the ProSentry Probe, the stand-alone device collects network information on all nine Ethernet RMON groups or the 10 token-ring RMON categories, and conveys it back to a central management console.

The ProSentry Probe, which appears as an end node on the remote network, captures RMON-based information and statistics on a per-network or per-node basis, assisting in problem identification, network optimization and trend analysis.

Information provided via the RMON groups includes ring purge, beaconing, lost frame and soft error reports for token ring, and collisions, frame fragments and number of oversized and undersized packets for Ethernet.

The information is passed to a Simple Network Management Protocol-based manager — such as Hewlett-Packard Co.'s OpenView or SunConnect's SunNet Manager — in a central location where administrators can analyze the information and head off potential problems. The SNMP platform must support the industry-standard RMON Management Information Base (MIB) and Bytex's ProSentry MIB in order to interact with the ProSentry Probe.

If the remote office has more than one ring or Ethernet segment, the ProSentry Probe can be logically switched from net to net for monitoring purposes if used in conjunction with Bytex's 7700 intelligent hub and Network Management System.

"By switching the Probe between different networks from a central location, the manager can ease the pain of troubleshooting and save the cost of constantly sending technicians on the road to discover the cause of a problem," said Michael Cookish, product marketing manager at Bytex. "This capability also makes the Probe attractive in collapsed backbone environments, where one Probe located in the basement with a 7700 hub can be switched to the networks on each floor to capture information."

The ProSentry Probe complements Bytex's existing RMON-based management offerings, the ProSentry Client and ProSentry Agent, which run on a Unix-based Sun Microsystems Computer Corp. SPARCstation. By offering a stand-alone device without the added cost of a Unix box, Bytex

See RMON, *page 23*

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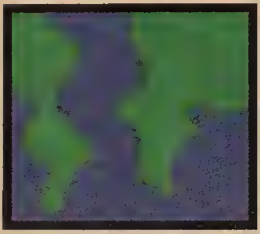

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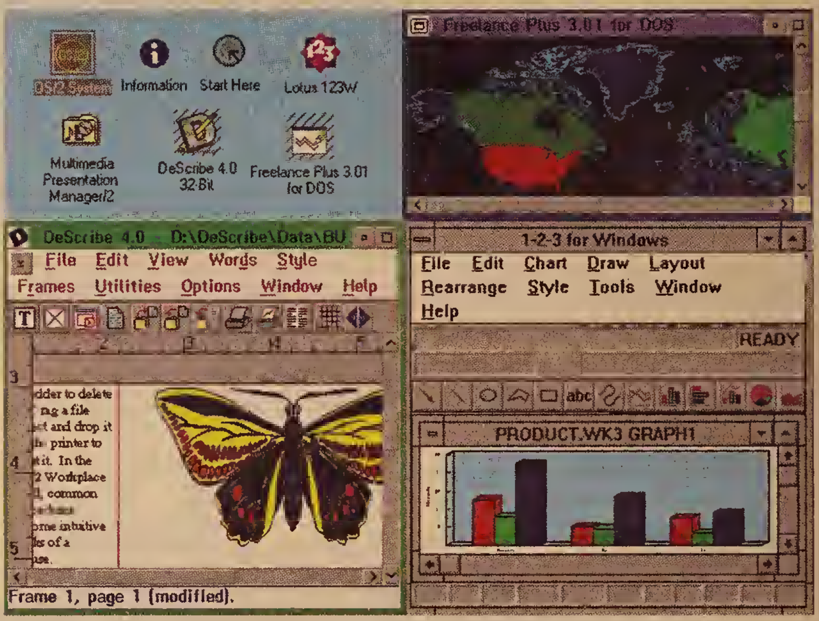
Portable users will be glad to know that OS/2 2.1 provides industry-standard Advanced Power Management (APM) support, to help extend battery life.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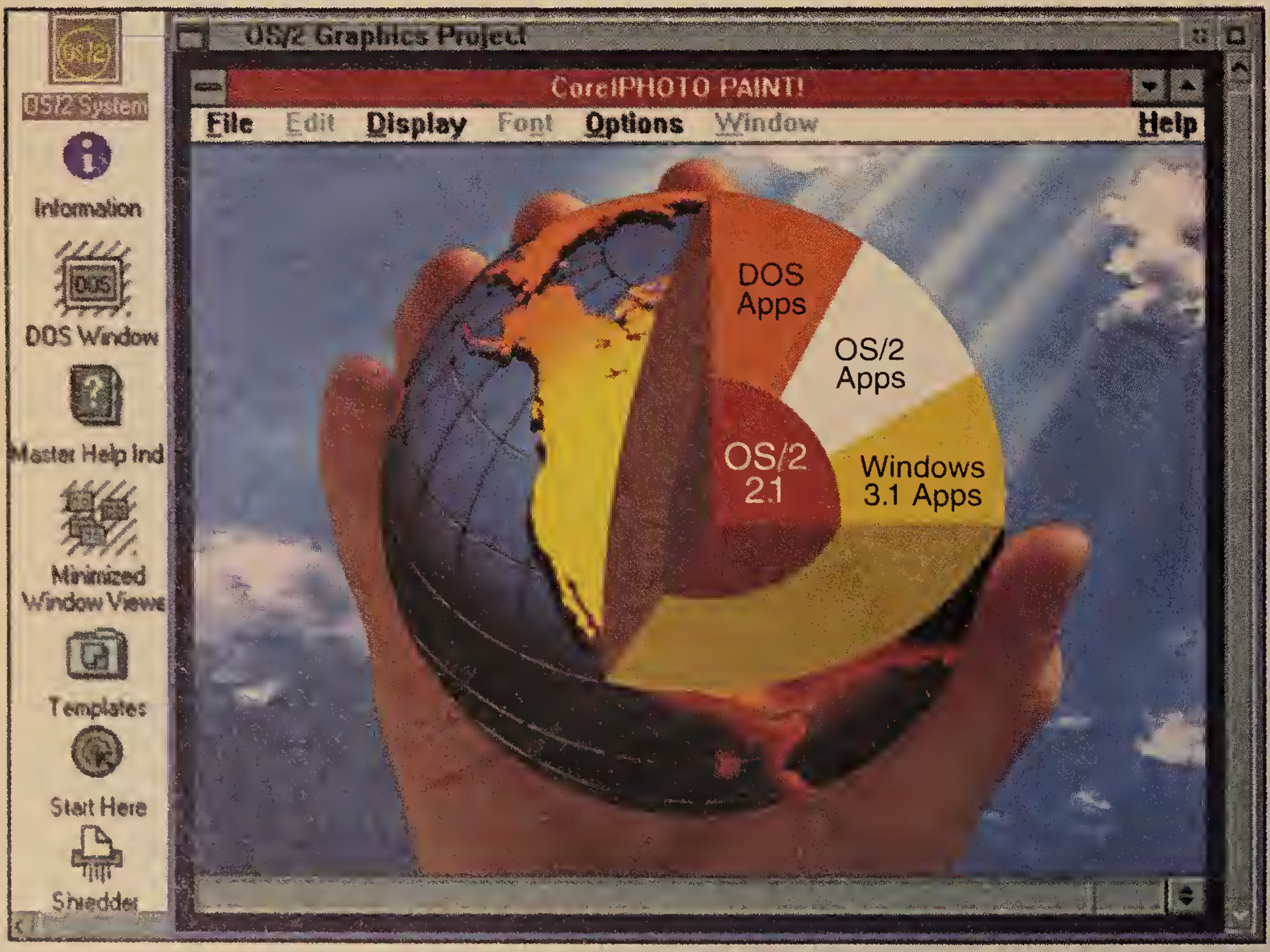

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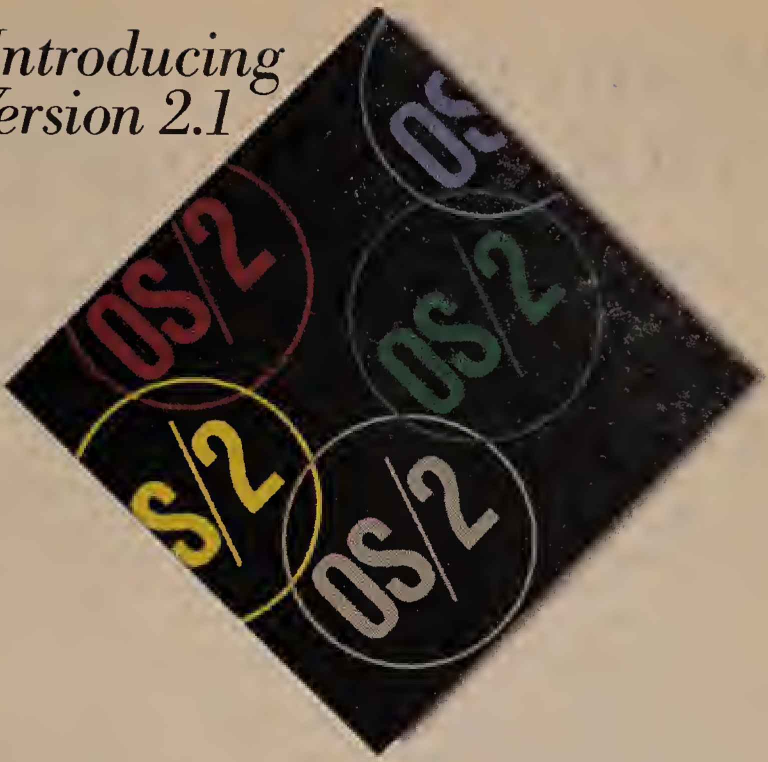

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- New TrueType fonts, Windows applets, File Manager.
- Advanced Power Management (APM) support extends battery life for portables.
- OS/2 Crash Protection and pre-emptive multitasking.

Easy to use
- Now also available on CD-ROM.
- Object-oriented Workplace Shell interface.

Advanced 32-bit architecture
- Seamless SVGA support.
- Fully exploits latest multimedia applications.
- Supports CD-ROM, PCMCIA and pen technologies.

IBM®

3Com gets in on FDDI over copper

BY SKIP MACASKILL

Santa Clara, Calif.

Sell when you can.

Taking Shakespeare's advice to heart, 3Com Corp. last week joined the rapidly expanding FDDI-over-copper market with a hub that supports a draft ANSI standard for Fiber Distributed Data Interface over copper wiring.

Following many of its rivals, 3Com unveiled the LinkBuilder FDDI Workgroup Hub, a four-slot device that can handle up to 24 users via modules supporting shielded or unshielded twisted-pair and fiber-optic connections. One slot is reserved for a management module, which supports the processor, the FDDI media access control and an out-of-band console management port.

Users can select three module types: a four-port module with fiber-optic connections, a six-port module supporting shielded twisted-pair ports and an eight-port unshielded twisted-pair module.

The hub, which supports the draft ANSI standard for FDDI over copper — expected to be finalized this fall — can be single-, dual- or null-attached, and supports dual homing as well.

For net management purposes, a Simple Network Management Protocol proxy agent and SunConnect SunNet Manager net management application will be available in the first quarter of next year.

Priced between $549 and $1,098 per port, the LinkBuilder FDDI provides the advantages of high-speed connectivity at fixed-port hub prices, according to George Prodan, product line manager of high-speed technology at 3Com.

"Bringing the per-port costs down for this technology is going to fuel the market," he said. "Because other technologies are emerging and still causing market confusion for users, FDDI over copper has a window of opportunity, but the price has to be right."

The fiber module costs $1,098 per port, while the shielded modules cost $549 per port. Pricing has not yet been set for the unshielded modules, but will unlikely be more expensive than the shielded versions.

The chassis itself costs $995, and the net management card is priced at $2,295. All products will be available in 60 days. Z

✆ 3Com: (408) 764-6700.

OracleWare

Continued from page 19

and OracleWare System UnixWare Edition combines them with Novell's UnixWare operating system.

The NetWare 3.X and UnixWare packages are expected to be available in September and the NetWare 4.0 product in the first quarter next year, according to the companies. In addition, a multiprocessing version of the UnixWare Edition will be released in mid-1994. Pricing has not yet been set on any of the products.

With the initial bundling arrangement, the products will have the advantage of an integrated install program and on-line documentation, but little more in terms of combined functionality. In time, however, the two will grow together.

"We don't do exclusive deals with anybody," Novell's Ray Noorda said.

"Integrated products means more than just shipping two products together," said Jan Newman, executive vice president and general manager for Novell's NetWare Systems Group, based in Provo, Utah.

For example, all OracleWare versions initially include a gateway to let Oracle Office mail users communicate with Novell's NetWare Global Message Handling Service (MHS) users. Ultimately, OracleWare will natively support both Novell's Global MHS as well as Novell's NetWare Directory Services — something other database products will not be able to do.

Still further down the road, the full product line will provide integrated system management through Novell's NetWare Management System and other Simple Network Management Protocol-based platforms.

The companies also announced last week that the OracleWare package will be sold, installed and supported through Novell's extensive reseller channel, although OracleWare support will also be provided directly through Oracle.

Somewhat unexpected was the revelation that this is not an exclusive agreement. "We don't do exclusive deals with anybody," said Ray Noorda, Novell's chairman. Although nothing is currently in the works, he said there is the possibility of similar deals with other database vendors.

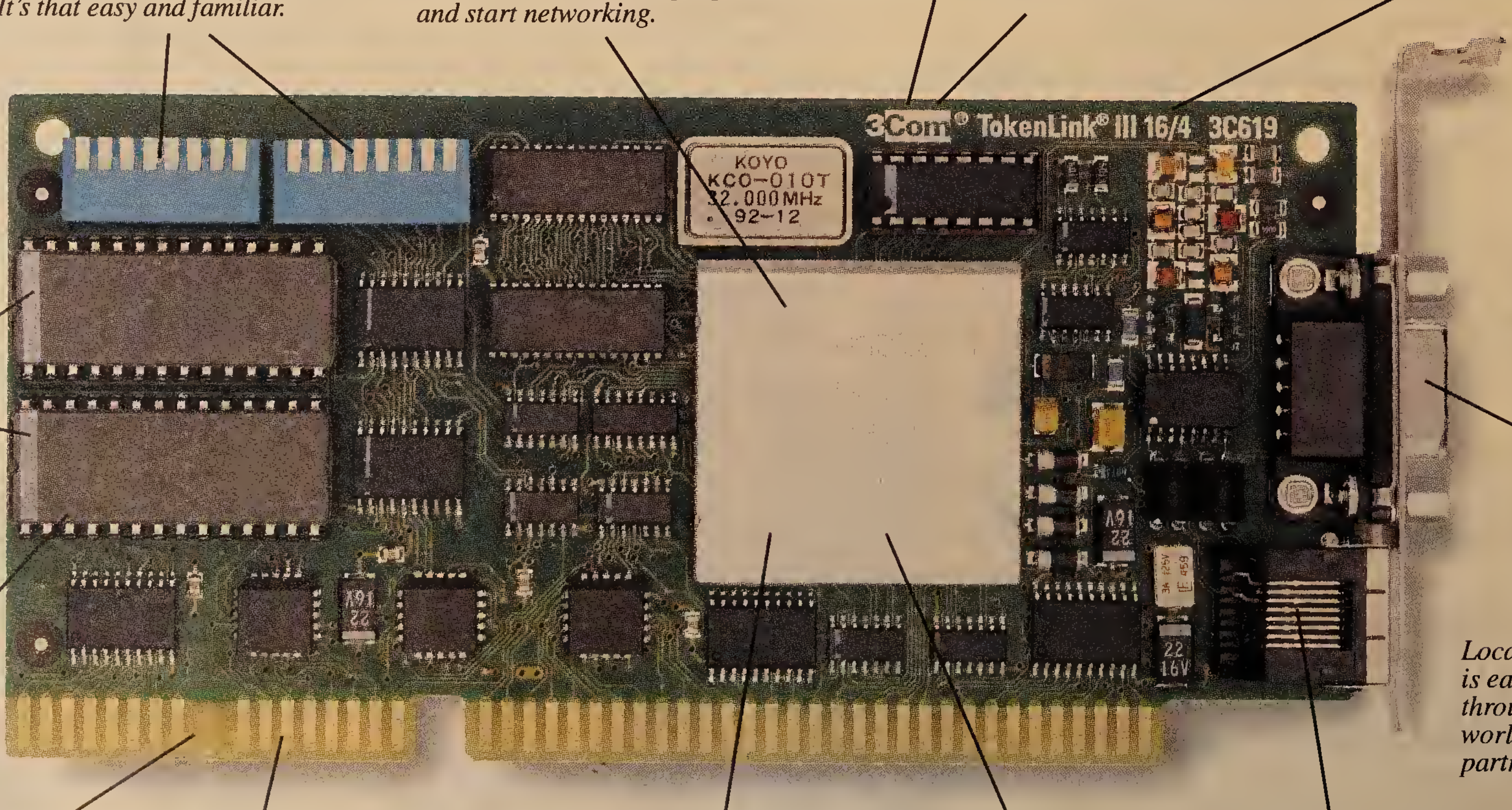
Observers agreed that the Novell/Oracle deal seemed to be in direct response to Microsoft Corp.'s decision to bundle Sybase's SQL Server with Windows NT.

Larry Ellison, president and chief executive officer of Oracle, pointed out the differences between the two products. "We're working closely together to provide not only a good database on a platform, but we also want to provide enterprisewide computing.

Users echoed these sentiments. "We went with Oracle and Novell because we're setting up a distributed enterprisewide network and using it in an environment where it's never been used before," said Scott Davis, network systems manager for the Fred Hutchinson Cancer Research Center in Seattle.

The research center is in the process of conducting a $625 million, 15-year national clinical study involving 45 sites and 160,000 women to determine preventive measures that can be taken against women's biggest health problems. The study is being sponsored by the National Institute of Health.

"Our neck is on the line with this one," Davis said. The cancer center wanted a system "that would give us maximum bang for the buck [from] companies that would stand behind us." Z



A mean time between failure of 20.5 years means you will never have to worry about 3Com's TokenLink III adapters.

3Com TokenLink III adapters fit seamlessly with 3Com Token Ring hubs, bridge/routers, and network management software. They're part of a total Token Ring solution from 3Com.

Available off the shelf from thousands of authorized 3Com resellers worldwide.

Five million computers have been hooked up to networks using 3Com adapters. No other company has more experience in adapter technology.

Supports 16 Mbps and 4 Mbps over shielded and unshielded twisted-pair.

Install TokenLink III exactly as you would any IBM 16/4 Network Adapter or Adapter/A. It's that easy and familiar.

Works with your existing IBM drivers so compatibly, we don't ship TokenLink III with any drivers at all. Just plug in TokenLink III and start networking.

Lifetime warranty. If a 3Com TokenLink III adapter fails during the life of your machine, we will repair or replace it free of charge.

The confidence of your peers: 3Com is an award-winning supplier in the networking industry.

First to be SNMP manageable. 3Com's LinkWatch™ Token Ring software provides feature-rich, driver-integrated SNMP agents. Also manageable under IBM LAN Network Manager and NETView.

Better reliability costs nothing extra. 3Com TokenLink III adapters are surprisingly affordable.

A universal boot PROM lets you download existing IBM drivers from popular operating systems, such as NetWare, LAN Server, LAN Manager, and Banyan Vines.

No jumpers or switches to set for unshielded twisted-pair or shielded twisted-pair connections.

A unique 3Com TokenLink III feature: an RPL utility to facilitate easy remote downloading of network drivers.

Local service and support is easily available through 3Com's worldwide network of partners and distribution.

Need 32-bit EISA? Rest assured, 3Com TokenLink III 32-bit EISA adapters are available for this machine.

16-bit performance. Not just 8-bit.

Money-back guarantee if TokenLink III is not 100% compatible with any application or driver that runs on either an IBM 16/4 Network Adapter or Adapter/A.

IBM-designed TROPIC chip guarantees full IBM compatibility.

On-board, unshielded twisted-pair connector comes standard with 3Com TokenLink III adapters. No need to pay extra for external media filter.

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Novell completes USL acquisition, gains in market

BY CARYN GILLOOLY

Provo, Utah

Novell, Inc. last week officially completed the acquisition of Unix System Laboratories, Inc., giving the leading LAN vendor what analysts say is a corner on the Unix market.

Under terms of the Novell-USL agreement, AT&T will receive 11.1 million shares of Novell common stock in exchange for the telecommunications giant's 77% share in USL.

> **"Novell faces formidable tasks in the years ahead," the Burton Group reported.**

Prior to the agreement, Novell owned 5% of USL and the remaining 18% was divided among investors including Sun Microsystems, Inc., Toshiba Corp. and Ing. C. Olivetti & Co., S.p.A. Those companies will keep their stake in USL.

USL will become a wholly owned subsidiary of Novell. Roel Pieper will continue in his role as president and chief executive officer of USL, but will now report to Ray Noorda, Novell's chairman.

In addition, Univel — a joint venture of Novell and USL — will now be a full Novell subsidiary.

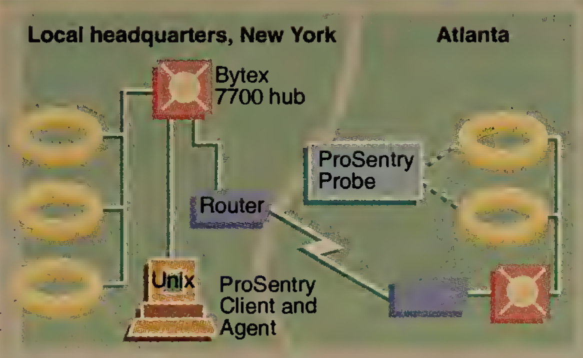
Univel develops and sells UnixWare, an off-the-shelf version of Unix that is able to run on Intel Corp.-based machines.

In an analysis of the acquisition, The Burton Group, a research and consulting firm based in Salt Lake City, said Novell's purchase of USL is ''the best thing that could have happened to Unix, Unix would have never risen to compete with [Microsoft Corp.'s] Windows NT as an AT&T technology.''

Yet despite the fact that Novell is probably in the best position to bring Unix into the mainstream, there are still a lot of obstacles the company must overcome.

"Novell faces formidable tasks in the years ahead," according to the Burton Group report. "[It] must integrate and unify the Unix marketplace while integrating the PC LAN and Unix cultures — creating an organizational structure to sell operating system and network services." ☒

Reaching out for RMON



The ProSentry Probe can be used in remote offices to compile Remote Monitoring (RMON) data on a single network or on multiple LAN segments when used in conjunction with Bytex's intelligent hub. Bytex also offers ProSentry software that runs on Unix machines and provides the same information.

SOURCE: BYTEX CORP., WESTBOROUGH, MASS.
GRAPHIC BY SUSAN J. CHAMPENY

RMON

Continued from page 19

can make RMON more affordable for remote offices, Cookish said.

The ProSentry Probe can also aid in usage billing, whereby administrators are able to track how much traffic and network bandwidth each particular end node is using.

Bytex is planning to offer the ProSentry Probe as a one-slot module for its 7700 hubs by the end of the year. The company is also developing DOS-based RMON agents.

Available now, the token-ring ProSentry Probe costs $5,995, while the Ethernet ProSentry Probe is priced at $4,995. ☒

☎ Bytex: (508) 366-8000.

BRIEFS

Continued from page 19

Instruction Set Computing processors. The client packages operate on Sun Microsystems Computer Corp. SPARCstations and any Windows-based personal computer that interoperates with SunConnect's SunNet Manager, Hewlett-Packard Co.'s OpenView, Digital Equipment Corp.'s PolyCenter and IBM's NetView/6000 net management systems.

Frontier Software: (508) 851-8872.

Madge Networks, Inc. has a new line of token-ring adapters, the Smart 16/4 Bridgenodes, which contain an application-specific integrated circuit that supports the high-speed source route bridging function of the Novell, Inc. NetWare Multiprotocol Router (MPR). They come in three flavors: the Smart 16/4 AT Bridgenode, the Smart 16/4 Extended Industry Standard Architecture (EISA) Bridgenode and the Smart 16/4 MC32 Bridgenode for ISA- and Micro Channel Architecture-based platforms. A typical configuration for bridging and routing between four token rings with MPR and the Bridgenodes, including a personal computer platform, would cost less than $10,000. Available now, the AT Bridgenode costs $1,045, while the EISA and MC32 Bridgenodes cost $1,395 each.

Madge Networks: (800) 876-2343. ☒

IBM compatibility. That was the easy part.

You'd like a Token Ring adapter that was 100 percent compatible. 100 percent reliable. And 100 percent guaranteed.

But why settle for that?

With 3Com's TokenLink® III Token Ring adapters you get the IBM®-designed TROPIC™ chip, a lifetime warranty, and a money-back guarantee. But that's just for starters.

There's also a universal boot PROM with the Remote Program Load (RPL) utility, so you can easily download existing IBM drivers from all the popular network operating systems. A choice of adapters for 32-bit EISA, 16-bit ISA, or 16-bit Micro Channel® machines. And a choice of unshielded twisted-pair or shielded twisted-pair at 4 or 16 Mbps. No other IBM-compatible adapter family offers such flexibility.

And no other IBM-compatible Token Ring adapter company has more experience in making adapters, either. More than five million computers have been hooked up to networks using 3Com adapters.

And if all these extras sound expensive, you are in for a very pleasant surprise. 3Com® TokenLink III adapters cost less than IBM-compatible adapters while offering much more.

But why not see for yourself? Call **1-800-NET-3Com** for the name of the authorized 3Com reseller nearest you. And find out how the easiest job of all is running with 3Com TokenLink III adapters.

3Com®

Networks That Go the Distance™

Stock markets may have their ups and downs, but your hub network can't. That's why LANNET designed MultiNet™ - an intelligent, fault tolerant LAN Hub that keeps your network on

the up-and-up. Its blue-chip qualities include port, segment, and power supply redundancy and hot-swappable modules. This fully distributed design has no single point of failure.

FAULT TOLERANCE *Failsafe - and flexible. Unmatched protocol support brings multiple-network, multisegment Ethernet, Token Ring, FDDI, LocalTalk, and RS232 into one hub. Monitored modules integrate bridging and routing, and can be remotely reconfigured using our SNMP- compliant MultiMan™ Network Management software. Future network power is built into the MultiNet Hub. When your requirements extend to high-bandwidth applications like full-motion video and workgrouping, LANNET's LANswitch™ responds with an ATM- ready 1.28 Gbps backplane, providing high-bandwidth on demand over standard 10BaseT networks. So, if you're looking for a secure investment with high dividends, it pays to call 1-800-5-LANNET. We're one market that'll never let you down.*

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EMBARC℠
BY MOTOROLA

WE BRING NETWORKING TO THE TRENCHES

EMBARC
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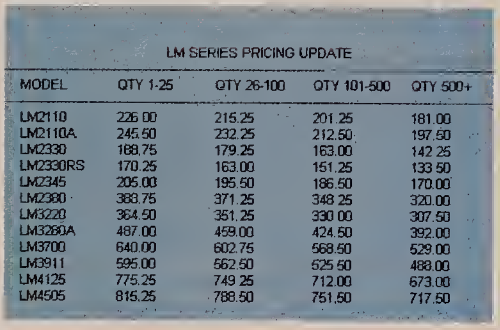
To a team on the move or one key player: *Flexible addressing lets you select priority and recipients. Send an urgent memo to a single user, or broadcast routine reports and file updates to thousands.*

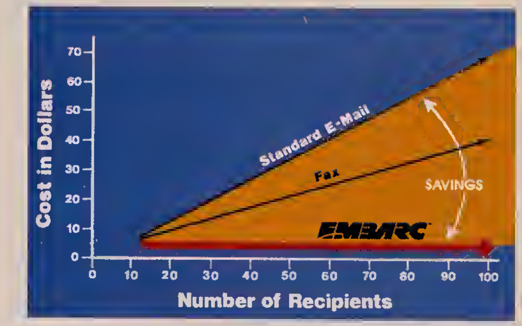


LM SERIES PRICING UPDATE

MODEL	QTY 1-25	QTY 26-100	QTY 101-500	QTY 500+
LM2110	226.00	215.25	201.25	181.00
LM2110A	245.50	232.25	212.50	197.50
LM2330	188.75	179.25	163.00	142.25
LM2330RS	170.25	163.00	151.25	133.50
LM2345	205.00	195.50	186.50	170.00
LM2380	388.75	371.25	348.25	320.00
LM3220	364.50	351.25	330.00	307.50
LM3280A	487.00	459.00	424.50	392.00
LM3700	640.00	602.75	568.50	529.00
LM3911	595.00	562.50	525.50	488.00
LM4125	775.25	749.25	712.00	673.00
LM4505	815.25	788.50	751.50	717.50

More than E-mail: *Unlike short-format services, EMBARC's large message format accommodates such vital information as custom reports, spreadsheets and database updates.*

Wireless information services add value: *The EMBARC basic subscription includes USA TODAY news and weather briefs. Optional news services range from personal investing to specific coverage provided by INDIVIDUAL, Inc.*



The wireless bottom line: *With EMBARC, broadcasting to many geographically dispersed users costs the same as transmitting to one. Thus, EMBARC can be far more cost-effective than traditional alternatives such as FAX, phone or mail.*

EMBARC is the strategic wireless solution

Information for those who need it most

EMBARC (Electronic Mail Broadcast to A Roaming Computer) enhances the productivity and competitiveness of your company by reaching out to your mobile work force.

As portable computers get smaller and more powerful, users are taking critical applications on the road. But the need for updated information often keeps these mobile users tethered to phones and fax machines, and they risk missing important information between contacts. EMBARC has changed that by introducing an economical one-way wireless connection between your network and your mobile work force.

You can now transmit vital information to users in over 200 cities in the U.S. and Canada. They can receive it without wires, faxes or phones. E-mail messages, custom reports, technical briefs, and even database updates can be delivered via the EMBARC wireless network.

Motorola's NewsStream receiver is the key to wireless connectivity and economy

The pocket-sized NewsStream receiver connects to the serial port of most desk-top, laptop, notebook and palmtop computers. Its low power requirement permits non-intrusive "constant on" operation.

NewsStream automatically receives and stores messages and files of up to 32KB in length. Busy users can always have current information at their fingertips, without interruption.

Enterprise networking means delivering business communications to wherever business is done

True wireless networking means E-Mail, databases, and custom reporting applications

EMBARC is based on paging technology, but shouldn't be confused with traditional numeric and alphanumeric paging services. With its large, flexible message format and 8-bit binary file capabilities, EMBARC supports your vital, real-world networking applications.

In addition to wireless E-mail targeted to single users, EMBARC is designed for low-cost multipoint communication. Technical updates, inventory reports, pricing bulletins, customer data, competitive analyses and other constantly changing information can be routinely and inexpensively broadcast to a work force scattered across the country. Even the databases on their portable computers can be updated—automatically!

EMBARC also conforms to your network access and security requirements—you control passwords, customized authorization lists and message encryption.

You control the cost

EMBARC's variable rates depend on message length, urgency and audience size—all determined by you. For instance, consider a 750-character (half page) message directed to a single user: with four levels of message urgency, it can range in cost from $1.26 ("over-night": to destination by 5:00 a.m.) to $4.70 ("priority": to destination within 15 minutes).

Now imagine a 750-character message broadcast as a routine (overnight) message to 300 users across the country: The cost would be only $2.94—*less than $.01 per recipient!**

The economy of wireless networking isn't limited to portables

The NewsStream receiver also works with desktop computers. And, with special interface devices, it connects directly to FAXes and printers, too. This lets you reduce delivery costs, throughout your enterprise, for multipoint applications such as bulletins, newsletters and routine reports.

This capability also creates new opportunities for information providers searching for economical means to deliver newsletters, bulletins and other information to clients.

Easy connectivity

X.400 connectivity makes EMBARC easy to access via your corporate E-mail system, and through most commercial E-mail services, including GE QUIKCOMM, IBM Mail Exchange, Sprint Mail, Pacific Bell Connection, AT&T EasyLink, MCI Mail and Envoy 100.

Wireless information services

EMBARC's basic per-user subscription includes news and weather briefs from USA TODAY. Additional information packages cover everything from high-tech to pharmaceuticals to personal investing. HeadsUp news briefs about your industry are also available—compiled from over 100 news sources around the world.

We make wireless simple

Let us show you how EMBARC can help you achieve your field automation objectives. We'll even recommend systems integrators who can adapt EMBARC's capabilities to your specific requirements. Plus, with the EMBARC Corporate Trial Program, you can implement wireless business communication virtually risk-free. Call today for program details.

DOS and Macintosh Compatibility!
EMBARC service is available for DOS-based laptops and notebooks. HP palmtops and Macintosh Powerbooks.

1-800-EMBARC4 EXT. 675

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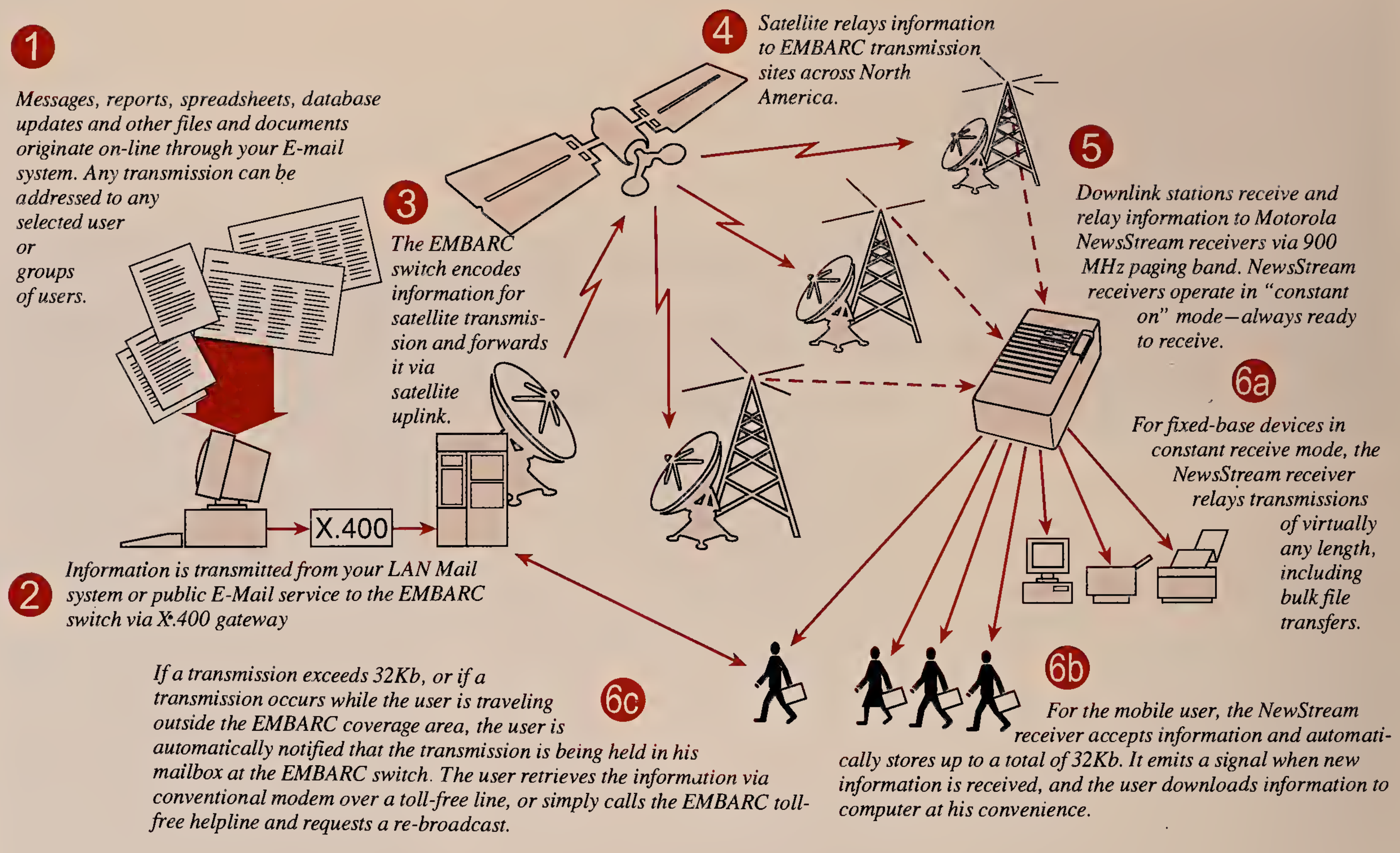
*Rates subject to change without notice.

HOW EMBARC WORKS



1 Messages, reports, spreadsheets, database updates and other files and documents originate on-line through your E-mail system. Any transmission can be addressed to any selected user or groups of users.

2 Information is transmitted from your LAN Mail system or public E-Mail service to the EMBARC switch via X.400 gateway

3 The EMBARC switch encodes information for satellite transmission and forwards it via satellite uplink.

4 Satellite relays information to EMBARC transmission sites across North America.

5 Downlink stations receive and relay information to Motorola NewsStream receivers via 900 MHz paging band. NewsStream receivers operate in "constant on" mode—always ready to receive.

6a For fixed-base devices in constant receive mode, the NewsStream receiver relays transmissions of virtually any length, including bulk file transfers.

6b For the mobile user, the NewStream receiver accepts information and automatically stores up to a total of 32Kb. It emits a signal when new information is received, and the user downloads information to computer at his convenience.

6c If a transmission exceeds 32Kb, or if a transmission occurs while the user is traveling outside the EMBARC coverage area, the user is automatically notified that the transmission is being held in his mailbox at the EMBARC switch. The user retrieves the information via conventional modem over a toll-free line, or simply calls the EMBARC toll-free helpline and requests a re-broadcast.

Why paging technology?
For starters, it provides the best in-building coverage of any wide-area wireless technology available. Signals reach the receiver from multiple directions, from multiple relay stations, so you don't have to worry about "dead" spots. But the primary advantage is the incredible economy of broadcast addressing—the ability to transmit to hundreds of users for the same cost as transmitting to one.

Why one-way communication?
It's a matter of cost, portability and efficiency. Because it's receive-only, the NewsStream receiver weighs only 3 ounces and can operate continuously for a full month on a single AA battery. Besides being lighter, less expensive and less power-hungry than two-way alternatives, simple non-intrusive one-way wireless communication can meet your needs now!

Why EMBARC?
As a part of Motorola's wireless revolution, EMBARC has shaped paging technology to fit your real-world networking needs—from E-mail to database management. And EMBARC's commitment to total service covers everything from defining your needs to staffing a 24-hour help line for you and your users. Contact us for details:

1-800-EMBARC4 EXT. 675

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EMBARC℠
BY MOTOROLA

Gateway debuts remote access product line

BY FREDRIC PAUL

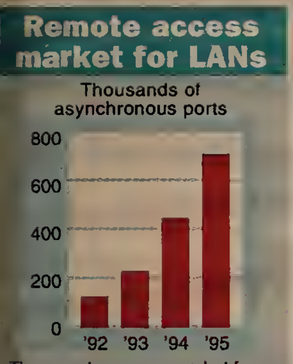
Irvine, Calif.

Gateway Communications, Inc. has announced three remote network access products that showcase the company's new focus on mobile users.

The new products include the LAN Access Server, designed for remote users who need to dial in as a remote node or get control remotely over a local node; LAN Expander 4-port, which allows as many as four remote users to dial in to a local-area network simultaneously; and G/PocketNet Adapter, a portable Ethernet interface card designed for use with laptops, notebooks and hand-held computers. After a preview in Europe late last month, the products received their U.S. introduction last week.

The products address different aspects of what it sees as a multifaceted remote access market. Gateway splits the remote LAN access community into areas: the 1.5 million LAN users who travel on business several times a month; the 25 million mobile workers; those in remote offices; and customers, vendors and business partners.

Remote access market for LANs



The remote access market for LANs is expected to continue to grow rapidly during the first half of the 1990s.

SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS.

The LAN Access Server provides its own local processing power using a 386SX processor, and supporting 4M to 8M bytes of random-access memory and VGA display capability. Its hardware is joined with remote access software developed jointly with Triton Technologies, Inc., the maker of CO/Session remote control software. Gateway's own data compression software speeds performance without requiring matched modems on both ends.

Attaching directly to a NetWare-based Ethernet network, LAN Access Server can provide dial-in LAN access as a remote node or via remote control of a local node. The remote node lets the user attach to any file server on the network, while the remote control method uses the LAN Access Server as a slave node to boost performance when running Windows or other demanding graphical applications.

Measuring just 6- by 6-in., LAN Access Server is shipping now for $1,795 with 4M bytes of RAM and $1,995 with 8M bytes of RAM.

The new LAN Expander 4-port — a multiuser enhancement to the company's single-user LAN Expander — is a hardware/software subsystem that attaches to any NetWare Ethernet LAN. It also supports dial-in access as a remote node or provides remote control of a local node.

New security features include requirements for an additional user name and password for remote access to the network, as well as automatic call logging, including user names and time spent on the network.

The 8- by 8-in. LAN Expander 4-Port is scheduled to ship this month for $1,595. Remote client software is provided free of charge.

Gateway also introduced the G/PocketNet Adapter, a cigarette pack-size Ethernet interface that attaches to the parallel port on a portable computer. The G/PocketNet Adapter joins Gateway's G/LapCard, a Personal Computer Memory Card International Association-based network interface card, to provide connectivity for all kinds of portable devices.

Scheduled to ship this month, the $349 unit uses snap-on Media Modules for 10Base-T, coaxial or attachment unit interface connections. Another cable attaches to a mouse or keyboard port for power. Initial versions will support NetWare, NetWare Lite, Windows for Workgroups, VINES and FTP Software, Inc.'s PC/TCP networks. Others drivers are under development.

✆ Gateway: (800) 367-6555.

Symmetrical Technologies brings optical storage devices to NetWare

New support lets product act as NetWare optical storage server.

Y CARYN GILLOOLY

Herndon, Va.

Symmetrical Technologies this week is expected to dd Novell, Inc. IPX support to its SPANServer optical torage devices, enabling them to be used as storage ervers on NetWare LANs.

SPANServer is a hardware/software combination hat supports direct connection to an Ethernet local-rea network via coaxial or twisted-pair wiring. Once inked to the network, the device appears as just nother peripheral to users. An administrator only has o assign SPANServer a network address to get it up and unning as an optical storage server.

The product supports both Novell's Internetwork acket Exchange and the Unix Network File System NFS). This lets NetWare and NFS users access the achine simultaneously. Previously, SPANServer nly supported NFS.

HAT'S DIFFERENT

Robert Sexton, vice president of marketing and les at Symmetrical Technologies, based here, said at unlike other optical storage products, SPANServer oes not require additional software at the client, rver or both.

In addition, he explained that SPANServer's modu-r architecture allows Symmetrical Technologies to add support for different types of LANs or operating systems over time.

Symmetrical wheels and deals

Symmetrical Technologies is expected to announce this week that:

- Access Graphics, Inc. has agreed to distribute SPANServer.
- Dickens Data Systems, Inc. has agreed to OEM SPANServer.
- Xerox Corp. has agreed to provide complete support and maintenance for SPANServer.
- Price Waterhouse has agreed to use SPANServer in systems integration projects.

GRAPHIC BY SUSAN J. CHAMPENY

"SPANServer allows users to implement optical storage, regardless of the platform, OS or application," he said.

SPANServer with both IPX and NFS support is available now.

Capacity for the jukebox ranges from 650M bytes to more than 1.4T bytes, with prices ranging from $14,000 to more than $300,000.

✆ Symmetrical Technologies: (703) 834-1800.

ETHERNET SWITCHING

Cabletron expands line with E-net switching

BY SKIP MACASKILL

Rochester, N.H.

Expanding its technology repertoire, Cabletron Systems, Inc. this week will announce an agreement with Artel Communications Corp. to incorporate Artel's Ethernet switching capabilities into its product line.

Cabletron will also announce that it has developed a net management application that will allow its connectivity products to be managed under IBM's NetView/6000 net management platform.

Through its deal with Artel, Cabletron will offer that company's Starbridge Turbo Ethernet switch as the ESX-820, an eight-port stand-alone switch that delivers 80M bit/sec of Ethernet connectivity. The switch can provide 10M bit/sec Ethernet links between communicating stations. Cabletron has added its Ethernet Port Interface Module to the Artel box, allowing users to mix and match various media types across all ports.

SKUBISZ
Cabletron

The hub maker turned to Artel because the company offered superior technology, said Tom Coburn, Ethernet product manager at Cabletron. "We believed Artel's technology was far above its competitors'," he said. "Their approach to switching jived with ours because it is a packet-switched approach based on [Intel Corp.'s] i960 technology. The fact that Artel is on the East Coast also came into play."

While the agreement will give Cabletron Ethernet switching capabilities for the first time, the firm sees it as a short-term move, with products based on its own Ethernet switching technology, Secure Fast Packet Switching, coming in the near future (*NW*, Nov. 23, 1992, page 2).

"The ESX-820 is to sell into legacy LAN environments," Coburn said. "There was demand for the capabilities. This meets the immediate need."

Available in 90 days, the ESX-820 costs $7,495.

The Cabletron NetView/6000 application, which has not been named yet, will help administrators manage Cabletron's entire line of products.

"By layering this application on top of NetView/6000 and using IBM's NetView-to-NetView/6000 application under development, users who want to stick with their SNA-based NetView management can still have control over the Cabletron devices in the SNMP world," said Michael Skubisz, director of product management for Cabletron.

The application is scheduled for release in the fourth quarter, and pricing has not been set.

✆ Cabletron: (603) 332-9400.

Intel

Continued from page 19

distribute them to the servers. A client portion is downloaded to the PC when it logs on to the server, automatically checking for the new virus.

Available now, LANDesk Virus Protect software costs $995 per server, and upgrades are available free of charge to buyers of LANProtect within 60 days of the LANDesk version shipment. Prior purchasers of LANProtect can upgrade for $195.

The StorageExpress XLD, ELD and XLE are backup servers that add scalability, data compression and digital audio tape (DAT) support to Intel's existing 8mm tape backup solution for NetWare networks. Quad streaming allows users to write to four different tape drives at once, while 2-to-1 data compression speeds throughput.

The $9,995 StorageExpress XLD is powered by a 33-MHz 486 chip, has a 500M-byte hard drive and houses up to four 2G-byte DAT drives for a total compressed storage capacity of 16G bytes.

The $7,495 StorageExpress ELD has a 25-MHz 486, a 200M-byte hard drive and room for a pair of DAT drives with a total compressed capacity of 8G bytes. The $13,495 StorageExpress XLE is configured like the XLD, with room for a pair of 8mm tape drives for up to 20G bytes of compressed storage. All are available immediately.

Other products Intel announced include the LanspoolExpress Print Accelerator, which works with Novell's NetWare Pserver technology to speed printing by as much as 25 times. Residing on the NetWare Loadable Module or on the remote print server, LanspoolExpress Print Accelerator costs $399 and is shipping now.

Intel's NET SatisFAXtion 2.0 software adds direct-inward dial (DID) capability to automatically route inbound facsimiles to their intended recipient via NetWare LANs. Available now, it supports Intel's SatisFAXtion boards and costs $1,995 for a 1,000-user version, and $995 for a 20-user version. It includes Intel's FAXability Plus fax software. For DID capability, EXACOM's $895 DID-200 Brick is also required.

✆ Intel: (408) 765-8080.

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GLOBAL SERVICES

Voice, Data and Wireless Services, Regulatory Issues and Voice CPE

BRIEFS

As expected, **AT&T** last week announced a new toll fraud monitoring service for small and midsized users that spend $20,000 a month or less on long-distance services.

With AT&T's new NetProtect Plus Service, companies with only a key telephone system and a few extensions can buy extra protection against toll fraud for only $10 a month and and a $25 onetime service installation fee per user location (*NW,* June 14, page 4).

With NetProtect Plus, the user gives AT&T up to three company contacts who can be reached at any time. When the carrier suspects toll fraud, AT&T will notify one of the contacts listed and, with the contact's permission, block any calls from the user's telephone system until it can be secured.

Since August 1992, all AT&T customers' calling patterns have been monitored under AT&T's NetProtect Basic Service. The carrier looks for calling patterns that exceed predefined limits. With this existing service, AT&T attempts to notify the user immediately, but if the suspected fraud occurs over a weekend and no one is present when AT&T calls, notification may not occur until the next workday.

Analysts have said that AT&T's other two existing toll fraud monitoring services are too expensive for many users, a claim that AT&T agrees with.

"Small business owners have told us they want fast, accurate notification of suspected hackers, and priced so they can afford it," said Rick Roscitt, a vice president at AT&T. "Now even the smallest business can afford protection from toll fraud 24 hours a day, seven days a week."

AT&T filed a tariff for NetProtect Plus with the Federal Communications Commission on June 15 to be effective July 30.

For more information, call 1-800-NET-SAFE.

Separately, AT&T, in conjunction with the International Teleconferencing Association (ITCA), is publishing the *Global Conferencing Source Book* - a comprehensive listing of videoconferencing services, products, sites and equipment suppliers.

The directory lists thousands of video facilities in the U.S., Canada, Europe, Latin America, Asia and the Pacific Rim.

The source book lists service providers, types of equipment used and the names and numbers of contacts, among other things. It also includes data on

See **Briefs,** *page 30*

MOBILE NETWORKING

Advertised data speeds mask actual mobile data rates

BY ELLEN MESSMER

Washington, D.C.

Net managers considering mobile data services for on-the-go corporate personnel need to be aware that the data speeds they see advertised do not reflect the rates achievable under real-life conditions.

Because of factors such as weather, vehicle speed and the very nature of radio frequency (RF) systems, actual over-the-air data rates — referred to as usable data rates — are considerably lower than advertised speeds, which are obtained in laboratory tests.

Slower speeds are not an issue for all applications, but they could cause problems and hike costs for applications that involve exchange of large files.

ARDIS and RAM Mobile Data, Inc., competing providers of nationwide data services, acknowledge that users will obtain lower rates under actual conditions than what they tout as the network speed.

The two firms acknowledge that users will obtain lower data rates under actual conditions.

Lincolnshire, Ill.-based ARDIS offers radio data communications service in more than 400 metropolitan areas and operates its network at 4.8K bit/sec in most places, although it is upgrading to 19.2K in the nation's 30 largest cities.

RF systems, which have to deal with harsh interference conditions, must be capable of filtering out extraneous information, checking for accurate data transfer and automatically resending data when necessary. As a result, the ARDIS system has a usable data rate of 2.4K bit/sec for the 4.8K advertised rates and 13.4K bit/sec for the 19.2 rate, according to Robert Euler, vice president of marketing for the company.

"If you're only sending 100 to 200 characters, those speeds become irrelevant," said Naomi Yermasian, ARDIS marketing director. "But large files would be affected."

RAM Mobile Data, the New York City-based company with services available in about 100 metropolitan areas, operates at 8K bit/sec, but the usable data rate is said to be 4.8K bit/sec maximum. Jeff Weinberger, RAM's manager of business development, said that network congestion is less an issue for RAM users because the RAM network is a multiple-channel system supporting 10 to 30 channels per market — in contrast to ARDIS, which is a single-channel system. Traditional problems with RF-based communications will also drag down the usable data rate for new services based on the Cellular Digital Packet Data (CDPD) standard that cellular carriers will roll out this year. Although CDPD is designed to allow equipment to operate at 19.2K bit/sec, the usable data rate is actually between 9.6K and 14.2K bit/sec, said Rob Mechaley, senior vice president and general manager of the wireless data division at McCaw Cellular Communications, Inc.

"Cellular's native 800 MHz has a 1-in-50 bit-error rate," said Mechaley. "That's incredibly high."

Council issues report on carrier reliability

Cites lack of mutual emergency aid pacts.

BY BILL BURCH

Washington, D.C.

While the U.S. public network is highly reliable and is likely to become even stronger, thanks to some recently proposed changes, the nation's carriers haven't made much progress in ironing out agreements for assisting one another during emergencies, according to a report from the Network Reliability Council (NRC).

Overall, carrier networks have a 99% availability rate, which is far better than the reliability of most computer systems, said John Healy, a Bell Communications Research researcher whose work provided the foundation for the NRC's reliability statistics. The NRC report examined telephone companies' network problems stemming from fiber cable cuts, switching and signaling system failures, fires and other problems (see graphic, this page). Healy said generally the public network is highly reliable, but he acknowledged, "We're not going to be able to prevent all outages from occurring; that's a pipe dream."

Carriers set up the Network Reliability Council at the behest of the Federal Communications Commission following a series of major network outages in 1990 and 1991. In particular, a set of Signaling System 7 problems that shut down parts of Bell Atlantic Corp. and Pacific Bell networks created doubt in users' minds about network reliability.

Statistically, clustered outages remain a problem. If a system has gone done, the chances of it crashing again within the next 90 days are slightly higher than normal, Healy's statistics reveal.

To date, carriers have not had any repeats of the major signaling system failures experienced two years ago. The biggest source of recent net problems by far has been switching systems, with 5,025 malfunctions reported in the first nine months of 1992. The causes of switching system failures have ranged from technicians not using proper procedures to software changes and defects, as well as data corruption and input errors.

To reduce those outages, the NRC has proposed in its report a set of so-called best practices that it hopes carriers will adopt. The council makes other recommendations designed to prevent fires and cable cuts, as well as failures in digital cross-connect, signaling, emergency 911 and power systems.

The NRC's goal is to increase network reliability by bringing total quality management principles to bear on carriers' operations. Many of the council's suggestions are focused less on technology issues than on work practices, which were at the root of many outages.

For example, 60% of cable breaks could have been prevented by stricter "call-before-you-dig" laws, the NRC believes.

When it was created in December 1991, the council had planned to disband with the release of its report. However, interim FCC Chairman James Quello decided the group should not disband, but continue to monitor network reliability to see whether its suggestions are being implemented and are effective.

Among the areas the council is likely to continue monitoring is the effectiveness of mutual assistance agreements, under which carriers join forces to help one another deal with network problems with minimum disruption to customers. Although such agreements proved effective in restoring service following the recent World Trade Center bombing in New York, many carriers do not participate in formal assistance programs.

New York carriers had signed a mutual aid pact under pressure from major customers and the metropolitan government (*NW,* Aug. 17, 1992, page 1). At a state level, only Alabama, California and Tennessee currently have such accords, the NRC report states. The seven regional Bell holding companies also have a mutual assistance pact.

For the most part, intercompany assistance is governed by informal arrangements.

Crash and burn: recent network outages

System affected	Number of outages
Emergency 911	123
Fiber cable	160
Power	294
Signaling network	437
Digital cross-connect	629
Switching	5,205

SOURCE: NETWORK RELIABILITY COUNCIL, WASHINGTON, D.C.
GRAPHIC BY SUSAN J. CHAMPENY

GLOBAL CALLING

Callback services offer users steep discounts

BY MARK LANGNER

An emerging class of international resale services, dubbed callback services, are making their mark on the global network market, bringing lower costs and higher functionality to users calling from overseas locations.

Callback operators are targeting countries where international calling costs are steep and circuit availability is limited — including many countries in South America, Africa and the Far East.

The market was pioneered by International Discount Telephone (IDT) of Hackensack, N.J., which started service in 1990.

"Our users are cutting their costs by 30% on average, and getting feature capabilities typically five or 10 years ahead of their time in most of these countries," said Martin Varsavsky, president of New York-based Viatel.

International callback services take advantage of the vast difference between the outbound international calling rates of foreign carriers and those of U.S. carriers. Callback service providers arbitrage these rate differences to generate revenue.

That strategy is paying off. The market is growing at a rapid clip and is estimated to be worth more than $225 million by the end of 1993, according to a report on international callback services from TeleChoice, Inc. More than 40 providers will be operating in more than 50 countries by the end of this year, the report says.

Where U.S. carriers once fought the business tooth and nail, through a series of filings with the Federal Communications Commission, the sheer volume of traffic is legitimizing the industry.

AT&T, one of the most vocal opponents of callback, just signed a $21 million three-year deal to provide Viatel with overseas communications services.

Callback works quite simply. A caller in a foreign country dials a telephone number to connect with a callback provider's switch. Most callback providers are set up so the customer lets the phone ring twice and hangs up. The switch dials back a predetermined number in the foreign country and provides the customer with U.S. dial tone to make the call.

Where toll-free services are available, customers dial the toll-free access number, enter an authorization code and make calls internationally.

"It's really call forwarding, not callback," said Viatel's Varsavsky. Whatever it is, the savings for users can be substantial.

For example, a phone call from Brazil to the U.S. through Embratel, a Brazilian carrier, costs $2.75 a minute. The same call handled by Viatel costs $1.84 a minute, a savings of about 33%.

A call from Brazil to France via Embratel is $3.30 a minute vs. $2.60 a minute using Viatel — a savings of about 20%.

Aside from lower costs, increased functionality is selling the services.

For instance, once callers reach a U.S. dial tone, they can make multiple calls sequentially over the same connection.

Viatel, IDT, Telenational of Omaha, Neb., and Telegroup of Fairfield, Iowa, are the largest providers of callback services. Viatel recently completed financing for a 10-city European private network that will begin offering European virtual network services later this year.

Langner is a senior analyst at TeleChoice, Inc. in Verona, N.J.

Comments

If you have a comment on this or any other article, drop us a fax at (508) 820-3467 or call (800) 622-1108, Ext. 487.

PacBell widens SMDS deployment

BY BOB WALLACE

San Francisco

Pacific Bell said last week it is offering Switched Multimegabit Data Service (SMDS) in four additional areas and supporting SMDS speeds beyond T-1.

The new regions are the northern Sacramento Valley, northern and central San Joaquin and the central coast area. Pacific Bell had already offered SMDS here and in Los Angeles, San Diego and Sacramento, Calif. Pacific Bell already supports SMDS at speeds of 1.17M, 4M and 34M bit/sec and will soon offer SMDS at 10M, 16M and 25M bit/sec.

The Bell operating company, which was one of the first to commit to SMDS, now has the widest deployment of the emerging high-speed data network services and is also the first local carrier to offer SMDS at speeds faster than 1.134M bit/sec. Pacific Bell now offers SMDS in eight of its 10 service areas.

Pacific Bell says it has signed up 17 Switched Multimegabit Data Service customers representing 150 access links since it began offering the service in late October 1992.

"User demand for SMDS has been strong and steady," said Lisa Lennon, project manager for fast packet services at Pacific Bell. "Given that, we realized we had to make the services more widely available."

Pacific Bell initially installed one AT&T Network System BNS-2000 switch in each city, but Lennon said strong customer demand for the service justified the addition of a second switch in Los Angeles and San Francisco.

LENNON
Pacific Bell

The carrier charges users a onetime $375 installation charge and $763 a month, which includes the T-1 access line, for unlimited use of the service. The offering also carries a onetime $1,324 access line connection charge.

Higher speed SMDS is supported with a T-3 connection access line. Pacific Bell offers SMDS at 4M bit/sec now and will offer it at 10M and 34M bit/sec by the end of the month.

Customers will pay $3,500 a month for 4M bit/sec and $6,000 a month for 34M bit/sec. Pacific Bell will price T-3 access to SMDS on a customer-specific basis, Lennon said.

Pacific Bell is testing the cards that the BNS-2000 needs to support SMDS at 16M bit/sec now and hopes to support that speed sometime in August.

The local carrier also plans to support a 25M bit/sec speed this year. The carrier is raising speeds beyond T-1 because users said current and planned applications needed more bandwidth. "They wanted to support applications, including imaging and channel extension," Lennon said.

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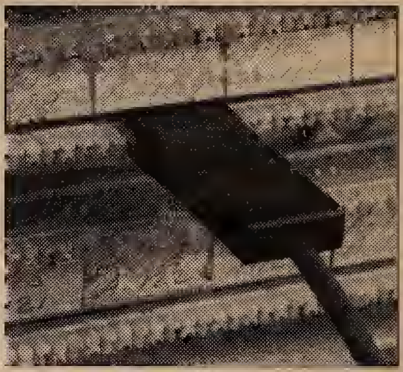

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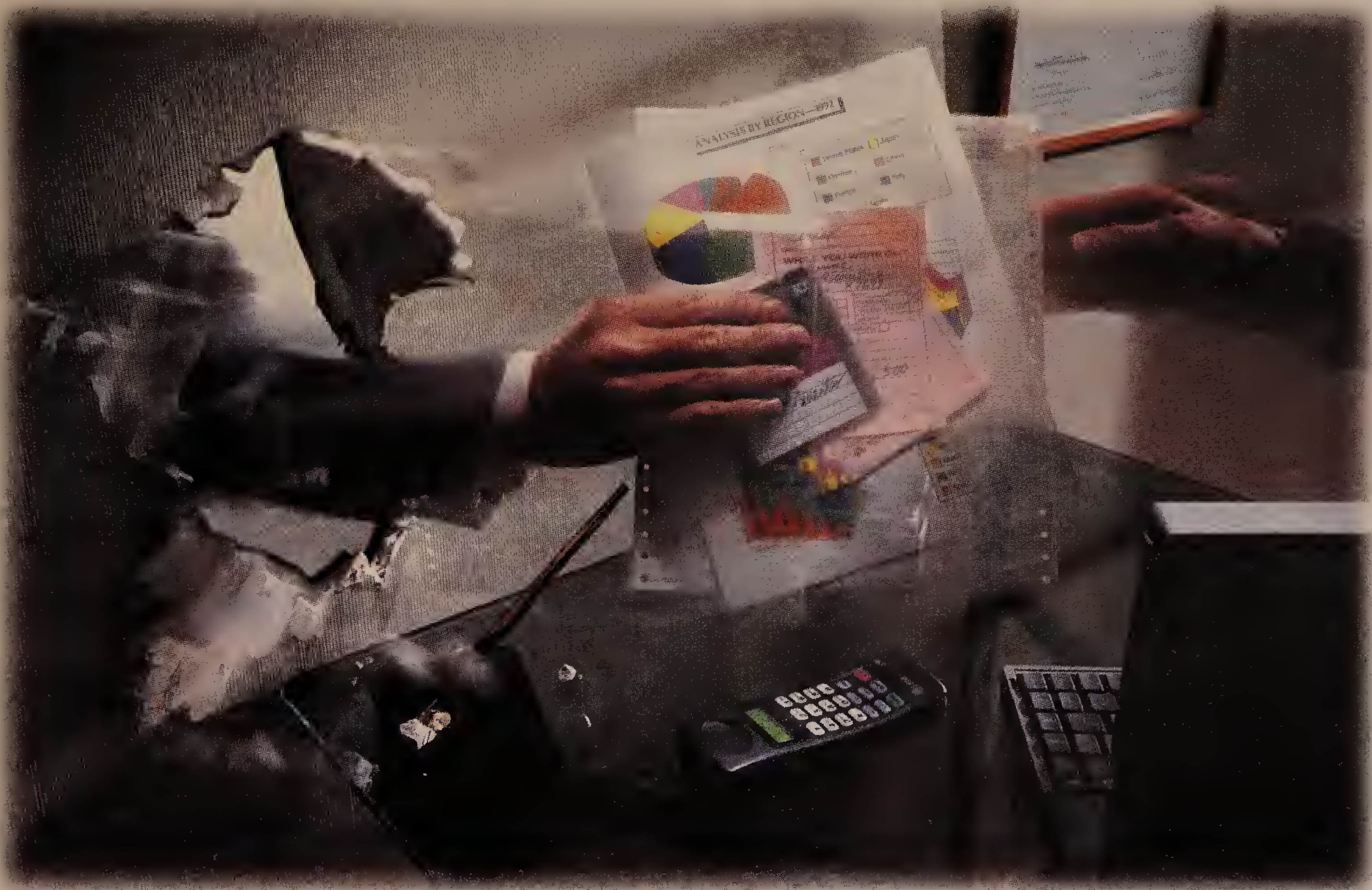

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Sun extends its net with InfoLAN

User links private and public networks.

BY FREDRIC PAUL

Mountain View, Calif.

Sun Microsystems, Inc. has signed a multimillion-dollar deal with Infonet Services Corp. to extend the Sun Wide-Area Network (SWAN) with Infonet's InfoLAN global internetworking service.

The deal will link SWAN, Sun's own router-based local-area network internet, with InfoLAN to bring Sun customers, vendors and mobile users into the network fold. Infonet will handle network management and local support for Sun applications.

InfoLAN has local Internet Protocol connections in 30 cities around the world, with service and support in 140 countries.

Michael Graves, Sun's vice president of information services, said Sun network hardware will eventually be co-located at Infonet facilities. Security relays in various locations around the world will pass data between the two networks.

GRAVES
Sun Microsystems

In addition to dedicated links from SunLink routers at existing SWAN sites, the integrated network will also support dial-in IP access for Sun employees anywhere in the world.

"[This] dramatically increases our network points of presence so customers and third parties can take advantage of our internal applications," Graves said.

Customers will be able to access Sun's product information database for pricing and availability, while third-party suppliers can work more closely with Sun's manufacturing and product distribution operations.

According to Graves, the InfoLAN deal gives Sun increased flexibility, allowing the company to change, expand or contract the network as business needs develop.

Sun has a "fairly aggressive rollout plan for the next six months to a year," Graves said. "But the network will continue to change over time."

SWAN currently supports communications among some 22,000 workstations users — a community that is expected to grow substantially, Graves said. Given that, the actual value of the deal is still to be determined.

The Sun and InfoLAN networks will use the Point-to-Point Protocol (PPP) to ease communications. "PPP is not new," Graves said, but it is not widely available. "[InfoLAN] didn't have PPP as a service," he added. "They will be developing it for us."

MONETON
Infonet

The move to InfoLAN will not disrupt Sun's network, said Larry Morgan, Infonet's vice president of marketing. Even though it is a hybrid environment, he said, "It's all going to appear as one private network."

Morgan said X.25 communications to the InfoLAN network are already in place and IP connections are being brought up now.

Both SWAN and InfoLAN are Transmission Control Protocol/IP-based networks, which eases interconnection, said Jean-Noel Moneton, Infonet's vice president and general manager.

BRIEFS

Continued from page 27

names and numbers of contacts, among other things. It also includes data on other conferencing service equipment.

AT&T and ITCA are already gathering information for future directories. Companies that want to be included in future editions may contact AT&T at 1-800-562-2255. To order copies of the directory, which cost $7.95 each, call 1-800-426-8686.

Syncordia Corp. has received a five-year, multimillion-dollar contract from BP Finance, the banking and treasury subsidiary of British Petroleum (BP), to provide and manage its data communications operations, which include a new global financial trading network that will link BP Finance operations in the U.S., Europe and Australia.

The agreement is part of BP Finance's move to replace its stand-alone regional financial trading systems with a single, integrated computer network that will improve internal communications and BP's interaction with world financial markets.

Under the terms of the contract, Syncordia will link BP Finance operations in Cleveland, Melbourne, Australia and Harlow, England in a high-performance data communications net. Customer support will be provided through Syncordia's new Customer Support Center in Maidstone, England, which was built to meet BP Finance's needs. Syncordia recently landed lucrative contracts with other BP units.

On a typical trading day, BP Finance processes more than $1 billion worth of financial transactions, primarily foreign exchange trades. BP Finance traders at each site will use the network to access real-time information on global currencies and credit positions. The company will also use the net services to support its internal settlements and accounting functions.

BP Finance is the sixth contract announced by Syncordia since it was formed in September 1991 by BP. Others include Amadeus, IBM Europe, BP Chemicals, Firmenich, BP Exploration and BP Corporate.

Sprint Corp. last week said it was awarded a three-year, $1.5 million contract to provide Reynolds and Reynolds Co., a Dayton, Ohio-based supplier of information management systems, 800 service for a number of customer service sites.

The contract calls for the carrier to provide 800 service for Reynolds and Reynolds' Business Forms Division's customer service operations in Celina, Ohio and Oklahoma City, as well as the company's Computer Systems Division's customer service center in San Diego.

The company had used AT&T 800 service for these sites but decided to move their toll-free services traffic to Sprint after its contract with AT&T expired. Reynolds and Reynolds already uses several Sprint offerings.

LOCAL LOOP

GTE looks to install 50 fiber rings in 12 states

BY BOB WALLACE

Irving, Texas

GTE Telephone Operations last week said it will spend $240 million to install fiber-optic local loops in a move designed to boost the reliability of the local carrier's networks and expand the availability of existing services.

The ambitious project calls for GTE to install 50 self-healing fiber rings in 12 states over the next several years, an effort that will enable the company to keep pace with alternative access service providers.

Once installed, the fiber rings will enable GTE to offer existing services, such as private lines, frame relay and Switched Multimegabit Data Service, more widely.

In addition, GTE will be able to provide new higher bandwidth data services.

The fiber rings will comprise transmission systems that will at least initially support Synchronous Optical Network speeds of 51.8M to 2.4G bit/sec.

"We've been extending fiber technology to customers for years, but these new rings give our customers significant increases in efficiency and reliability," said Clark Barlow, senior vice president of operations at GTE.

GTE selected AT&T Network Systems as its primary transmission systems supplier, with Northern Telecom, Inc. playing a lesser role. Of the $240 million, $170 million will be spent on equipment, with $70 million spent on fiber.

AT&T and Northern Telecom will provide systems that operate at Optical Carrier (OC)-3, OC-12 and OC-48 speeds, which are equivalent to 51M, 155M and 2.4G bit/sec, respectively.

Traffic on the self-healing fiber rings can be rerouted in as little as 60 msec in the event of a service interruption. This will dramatically improve GTE's network reliability.

PLANNED SITES

GTE has planned SONET rings for Dallas/Fort Worth, San Angelo, Bryan and Houston, Texas; Honolulu; Tampa, Fla.; Everett, Wash.; Beaverton, Ore.; and Erie and York, Pa.

The company will also install fiber rings in Bloomington, Ill.; Fort Wayne, Ind.; Branson, Mo.; Research Triangle Park, N.C.; Richmond, Dale City and Virginia Beach/Chesapeake, Va.

GTE hopes to have the lion's share of the fiber rings up and operational by year end, with the remainder due to go on-line in the first quarter of 1994, according to a spokeswoman for the company.

The carrier has more than 21 million access lines in a total of 40 states and countries.

MCI lands $1b deal from insurance firms

BY BILL BURCH
AND BOB WALLACE

Washington, D.C.

MCI Communications Corp. last week reached an agreement in principle with a group of insurance companies on a network services contract that may end up being MCI's largest ever.

Valued at more than $1 billion, the contract, which is still under negotiation, calls for MCI to provide the Insurance Value Added Network Services group with a wide range of network service over the next five years.

The group is a buying consortium for insurance companies and their business partners that currently has more than 400 members with an annual purchasing of some $900 million. Insurance executives started the organization in 1983, when they began pooling purchases to get volume discounts. The group today represents nearly 50,000 data network users.

MCI will supply group members with domestic and international voice, data, imaging and videoconferencing services. Since 1987, MCI has been supplying the group with 800 service and T-1 lines and virtual private network service. Annual business had grown to close to $100 million annually.

As part of the contract, MCI will work with the group to set up a network recovery plan for support of agents' field operations in disaster areas. That plan will provide for rerouting around downed lines and sharing of on-site cellular and personal communications services gear by member companies.

In a separate development, MCI announced it has received a four-year, multimillion-dollar contract to provide Kmart Corp. with a wide variety of network services, including 800, MCI's Virtual Network (Vnet) service, Vnet Calling Cards, Digital Data Services and Forum — a conference calling service.

MCI said the deal makes Kmart its largest conference calling customer. The carrier said it teamed with Kmart to develop a special feature that enables Kmart end users that want to access a conference call to enter a password with their telephone keypad instead of going through an operator.

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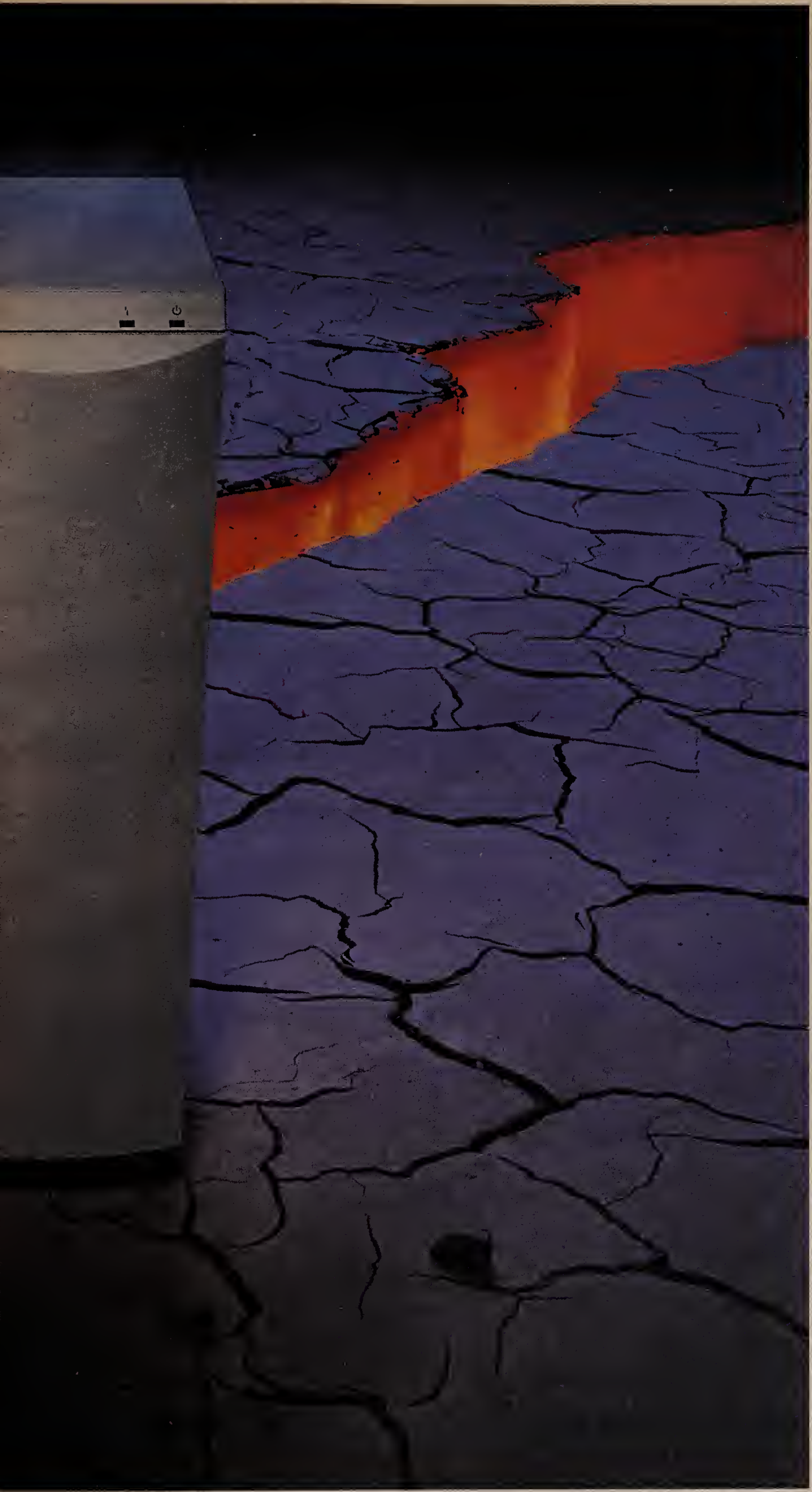
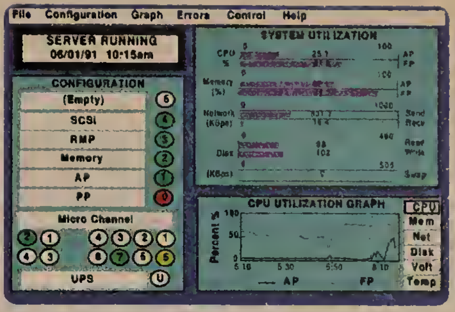
With the Maximum Availability and Support System/2 (MASS/2) option, the Server 195 provides comprehensive local and remote server monitoring, control, tuning

*Available from IBM, M-F, 8 A.M. to 5 P.M. in your time zone. **For information regarding the terms of IBM's money-back guarantee and limited warranty, please call 1 800 772-2227. Copies of IBM's money-back guarantee and statement of limited warranty are available upon request. IBM, Micro Channel, PS/2 and OS/2 are registered trademarks and HelpWare and HelpCenter are trademarks of International Business Machines Corporation. Novell and NetWare are registered trademarks of Novell, Inc. ©1993 IBM Corp.

It even tolerates





The MASS/2 option has a user-friendly GUI that lets you distribute computing power across your organization from a central location.

and recovery capabilities. MASS/2 works with a battery backed-up Remote Maintenance Processor (RMP) option that can notify you of errors, failures, corrective action taken—even provide system access during a power failure. And you can extend fault tolerance to the entire disk subsystem by adding an Orthogonal RAID-5 Disk Array/2.

Server 195/295 Comparison

Feature	Server 195	Server 295 Model 1	Server 295 Model 2
Remote Maintenance Processing and Modem	optional	standard	standard
Processors	486/50 MHz	MP–486/33 & 50 MHz	MP–2 486/50 MHz
Available Slots	8 Micro Channel®	12 Micro Channel	12 Micro Channel
MASS/2	optional	standard	standard

Like all PS/2s, the Server 195 is backed by IBM HelpWare™—a range of service and support so complete, it's hard to find fault with. You get a three-year on-site warranty with four-hour average response time,* around-the-clock set-up, usage and service assistance on IBM hardware and software during warranty,** a 30-day money-back guarantee** and more. For more information or an IBM certified dealer near you, call our Personal Systems HelpCenter™ at 1 800 772-2227 or TDD ASCII 1 800 426-4238. In Canada, call 1 800 465-7999. The new PS/2 Server 195 is so reliable, why would you tolerate anything less?

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BRIEFS

Wireless electronic mail service provider **RadioMail Corp.** demonstrated at the Electronic Mail Association show here last week a news and financial information delivery service called NewsFactory, which is available for free to RadioMail subscribers. NewsFactory provides portable computer users with news headlines or briefs, as well as Dow Jones & Co., Inc. information. Data is gathered from 16 wire sources, including United Press International and Business Wire.

RadioMail also announced that it has bundled its transport software with QUALCOMM, Inc.'s Eudora E-mail software to enable Apple Computer, Inc. PowerBook and PowerBook Duo users to exchange E-mail via RadioMail. The mail support will enable these users to send messages to or receive them from both wired and wireless E-mail system users.

The RadioMail service costs $89 per month, while the Eudora software is priced at $49.

RadioMail: (415) 286-7800.

Microsoft Corp. last week announced Version 3.2 of Microsoft Mail Gateway to X.400, which includes new administrative and local-area network connectivity features. The gateway, which already provided wide-area network connectivity via X.25, now features support for an Open Systems Interconnection LAN standard dubbed TP4/CNLP.

The new version also features an updated configuration and administration utility through which all gateway files and parameters are maintained. Microsoft Mail Gateway to X.400 3.2 is available now for $4,995.

Microsoft: (800) 426-9400.

Uniface Corp., an Alameda, Calif., client/server application development tool vendor, last week announced its Fusion Program for enabling independent software developers to build products that interface with Uniface 4GL. The program includes technical and marketing support, as well as specifications for building interface drivers to computer-aided software engineering tools, databases, networks and utilities, such as version control.

Uniface: (800) 365-3608.

Enterprise Solutions, Ltd. of Westlake, Calif., and **NCR Corp.** of Dayton, Ohio, last week announced a software licensing agreement under which they intend to integrate their electronic messaging products. NCR will sell Enterprise Solutions' Enterprise Mail X.400 E-mail and X.500 directory user agents as part of the NCR StarPro Enterprise Messaging product line.

Enterprise Solutions: (818) 597-8943; NCR (513) 445-5000.

Zoomit Corp., based in Toronto, last week unveiled its X.400 and Simple Mail Transfer Protocol (SMTP) Dual Stack, a software offering designed for use by Banyan Systems, Inc. VINES users that need to communicate with both X.400 and SMTP nets. The product provides transla-

See **Briefs**, *page 39*

PC database vendors extend enterprise reach

Compete on price, connectivity to diverse sources.

BY WAYNE ECKERSON

Austin, Texas

While still used primarily for desktop data storage, personal computer databases are taking on a bigger role in connecting users to data across the enterprise.

As the market matures for PC databases, vendors are competing on both price and the number of back-end SQL databases their products support. Microsoft Corp. last December upped the ante for PC database vendors when it launched Access, a Windows database designed for linking users to remote SQL databases — at a market-busting price of $99.

That introductory offer has won over more than 800,000 buyers and triggered a price war that has accelerated a shakeout in the Windows database market. With Lotus Development Corp.'s recent acquisition of Approach Software Corp., maker of an easy-to-use Windows database, the battle lines are now drawn.

Jousting for the position of the dominant provider of Windows databases are Lotus; Microsoft; Borland International, Inc., maker of Paradox for Windows; and Software Publishing Corp. (SPC), maker of Superbase.

"There is a winnowing out under way," said Richard Finkelstein, president of Performance Computing, Inc. in Chicago. "Where there used to be dozens of PC database vendors, now there are only a handful of serious competitors."

PC users are demanding access to departmental and divisional information stored on remote SQL databases — data they want to download into spread-

See Vendors, *page 38*

Leading Windows PC databases

Company Product	**Introductory price**	**Regular price**
Borland International, Inc. Paradox for Windows	$140	$795
Lotus Development Corp. Approach	Under consideration	$399
Microsoft Corp. Access 1.1	$99	$495
Software Publishing Corp. Superbase	$199	$695

GRAPHIC BY SUSAN J. CHAMPENY

Red Brick Systems enhances its data warehouse product

BY WAYNE ECKERSON

Red Brick Systems last week announced a new version of its data warehousing software that supports extremely large databases, selective data loading, and enhanced querying and report writing facilities.

Data warehousing is the process of extracting and consolidating data from multiple data sources into a decision support database that can be easily accessed and queried by end users.

Based in Los Gatos, Calif., Red Brick Systems was one of the first relational database management system vendors to offer data warehousing capabilities. The firm's product, Red Brick Warehouse, was demonstrated here at Digital Consulting, Inc.'s Database World '93 show. Red Brick Warehouse is used heavily by firms in financial services, consumer goods, and pharmaceutical and retail industries.

"A data warehouse extracts slices of data from operational systems on a regular basis, providing users with a comprehensive source of historical information about business operations," said Chris Erickson, Red Brick Systems' president and chief executive officer.

The product has three components: a loading mechanism that extracts and indexes operational data into the Red Brick Warehouse database server; the server itself, which stores and manages the warehoused data; and a specialized SQL query tool that provides access to the warehouse database.

Red Brick Warehouse runs on IBM's RISC System/6000, Hewlett-Packard Co.'s HP 9000 and Sequent Computer Systems, Inc.'s Symmetry 2000 Unix processors. It can be accessed by any front-end tool supporting Sybase, Inc.'s Open Client/Open Server application program interface across Transmission Control Protocol/Internet Protocol nets. The product is often used with Prism

See Red Brick, *page 39*

DIRECTORY SERVICES

by David Ferris

Is X.500 really on a roll?

Commercial X.500 directories are starting to appear, and some leading-edge users, such as NASA, are moving from prototypes to operational deployment. This month, public electronic mail providers will demonstrate a pilot X.500 system that lets users of one network browse through names in another. The pilot includes such notables as Advantis, AT&T, Canada Post Corp. and MCI Communications Corp.

It appears that X.500 is safely on its way to widespread deployment. But is it really?

X.500's usage will be very limited through the end of the century. Most firms will employ it only to connect in-house E-mail systems with public E-mail networks. For internal use, less sophisticated technologies, such as Directory Exchange (DX) from Santa Monica, Calif.-based Retix, will predominate.

Most E-mail products provide a directory lookup facility, but it only handles users of that particular system. To allow lookups across different systems, most companies maintain one central directory, which is often controlled by the human resources department and may store other data — such as start date, salary, review dates and telephone number. Often, the file is kept on a mainframe, although it can be on any platform.

FERRIS
Ferris Networks

NAME MAINTENANCE

In the simplest case, E-mail name maintenance — adding, deleting or changing accounts — is done directly on this central file. Utilities must be written to administer it and to propagate names to connected mail systems so users can browse through them via the address book lookup facility.

Name administration may take place in the mail systems themselves using typical administration tools and changes propagated to the central directory. There, all changes are consolidated and appropriate updates are transmitted to various mail systems.

In this case, utilities must be written to: extract updates from the various E-mail systems and send them to the central file; consolidate changes centrally; determine which update information needs to be sent to a given mail system and then send it.

Dealing with custom directory propagation is something most companies can do without. But once they have put in the effort, things usually work well.

Recently, packaged solutions have started to appear

See X.500, *page 37*

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THIS IS AMP TODAY.

AMP

X.500

Continued from page 35

for this. The main offering is Directory Synchronization, from Wayne, Pa.-based Soft-Switch, Inc. With this product, changes are made in mail systems and consolidated in a central file, from which updates are distributed to participating mail systems. It's possible to have a simple hierarchy of central directories, which is useful for consolidating directories.

Another key offering is Retix's DX, which works in the same way as Soft-Switch's product but has better error recovery tools. Retix is trying to establish DX as an open protocol. The company worked with Digital Equipment Corp., Pacific Bell and Soft-Switch in designing it and has published the specification.

DX-based products are about to appear. This month, Retix plans to release a central directory server and gateways to Lotus Development Corp.'s cc:Mail and Microsoft Corp.'s MS Mail.

In short, vendors are getting their act together. The days of do-it-yourself cross-system propagation are numbered.

What is striking about in-house directory propagation — whether it's a custom or a packaged job — is that most organizations get by perfectly well with a single file acting as central consolidator of directories. That has serious implications for X.500.

X.500 is harder to implement than other approaches, and usable X.500 solutions for in-house propagation will be much slower to appear. X.500 is unnecessarily complex, and companies do not need its elegant distributed database to handle in-house propagation. The Soft-Switch and Retix solutions will suffice, and they are available now, more or less.

Things do not look good for X.500. It's perhaps a little early to speculate, but I suspect that the DX approach will likely win in this field.

But X.500 will play an important role in helping users browse for addresses outside their organization (see story, this page). Mail vendors need to enhance their address books to let users browse external X.500 addresses. The software needs to be able to generate X.500 query packets and to read incoming X.500 packets. We will likely see these types of offerings in the next two or three years. ◼

✒ Ferris is president of San Francisco-based Ferris Networks, a networking and E-mail research firm.

Making X.500 work for you

X.500 is a directory system standard that helps users working on diverse mail systems to exchange messages. It does so by providing a mechanism for determining an electronic mail address. For example, suppose Tom Smith, an American, wants to send E-mail to Jim Jones, who works for XYZ Co. in London. Smith's E-mail package lets him browse names locally and through names on external mail systems using X.500. Smith requests a lookup for Jones and the software generates a query — a packet in X.500 format — and sends it to a local directory server.

The server does not know anything about Jones, his XYZ company or London, so it sends the query to the company's main directory server, which passes it onward to the public E-mail service — AT&T's EasyLink Services, for example.

EasyLink's directory knows that queries destined for London should be sent to BT's E-mail service. BT's directory knows XYZ but does not know who Jones is, so it passes the query to XYZ's corporate directory, which, in turn, generates an X.500 packet containing Jones' X.400 address.

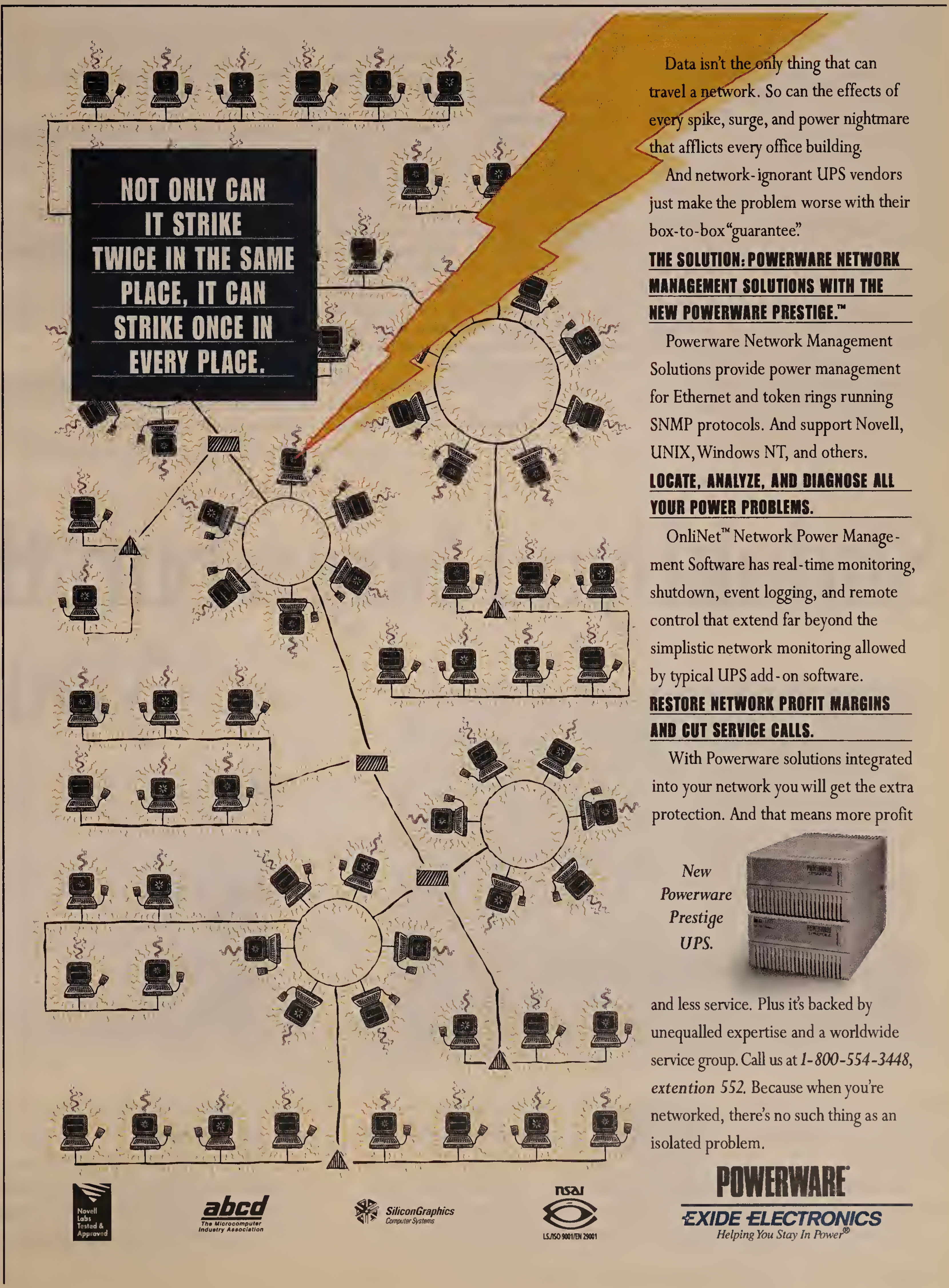
That information is returned to Smith, who uses it to send E-mail to Jones.

The chaining method described above is one of three ways X.500 directories can resolve queries.

A second method is known as referral, where a directory that cannot resolve a query refers the user to the directory where the information can be found.

In addition, there is multicasting, where a directory broadcasts a query to other directories, which try to resolve it.

✒ DAVID FERRIS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Start-up makes mark on distributed computing

Irish firm offers new tool for distributed applications.

BY WAYNE ECKERSON

San Francisco

Irish eyes were smiling last week as start-up Iona Technologies, Ltd. announced availability of a standards-based distributed object computing system that will compete with technology from computer giants such as IBM, Hewlett-Packard Co. and SunSoft, Inc.

Established by three computer science professors at Trinity College in Dublin, Ireland, Iona demonstrated the new object request broker (ORB) technology, called Orbix, at the Object World '93 show here.

Orbix, which runs under Solaris 1.1, will be ported to DOS, Windows and Windows NT by the end of the summer. By doing so, developers will be able to build distributed programs that run seamlessly across Unix and DOS/Windows machines.

Orbix comprises a software developers' kit as well as run-time libraries for building distributed, object-oriented applications using C++ language that comply with the Object Management Group's (OMG) Common Object Request Broker Architecture (CORBA) specification.

CORBA currently defines a standard application program interface for accessing ORB software, which manages message exchange between objects on one or more processors in a heterogeneous computing environment.

Unlike other CORBA-compliant products, Orbix was developed from the ground up to comply with CORBA. It adds just a basic naming service and a few other features to the CORBA specification that enable it to function as a full-development and run-time environment.

"It's a small, lightweight ORB designed for people who have been exposed to C++ programming and who want to distribute objects across multiple nodes," said Annrai O'Toole, Iona's vice president of development. "Because it's a basic implementation, Orbix is easy to use and imposes no performance overhead."

> **"Because it's a basic implementation, [Orbix] is easy to use and imposes no performance overhead," Iona's Annrai O'Toole said.**

Orbix uses the Sockets transport-level interface to support applications that work on Transmission Control Protocol/Internet Protocol networks. It also uses SunSoft's External Data Representation (XDR) for translating data types and structures between different machine architectures.

According to Iona officials, Orbix is being beta-tested by five companies in Europe and two in the U.S. One beta site, International Computers, Ltd. (ICL) demonstrated at Object World a graphics package it developed using Orbix.

THE DIFFERENCE

Unlike ORBs from other vendors, Iona's Orbix supports an Interface Definition Language compiler that generates C++ source code.

Most IDL compilers generate C code.

IDL is a programming language based on C that was developed by the OMG to describe objects, or more literally, define object interfaces.

An object interface defines the methods or functions an object can execute and uniquely identifies each object in a distributed environment.

Besides the C++ compiler, the Orbix software developers' kit contains a tool kit for building a CORBA-compliant dynamic interface, a run-time library, an implementation repository for storing objects, an interface repository for storing object interfaces and documentation.

Orbix also supports CORBA's static interface.

Iona is selling the software developers' kit for $5,000 and the run-time library for $100. ☒

✆ Iona: 011-353-1-6790677.

Vendors

Continued from page 35

sheet and other desktop applications. And vendors have adopted different strategies to address those user needs.

Microsoft's Access provides SQL connectivity to a number of SQL databases through drivers supporting Microsoft's Open Database Connectivity (ODBC) interface. Release 1.1 of Access, which shipped earlier this month, contains ODBC drivers for Microsoft's and Sybase, Inc.'s SQL Server and Oracle Corp.'s Oracle Server.

Release 1.1 also allows users to access Microsoft's FoxPro, Borland's Paradox and dBase databases, as well as import data from Novell, Inc. Btrieve files and Microsoft Excel spreadsheets. With dozens of database vendors ready to ship ODBC drivers, Access could easily provide links to most of the popular SQL databases soon.

The only problem Microsoft faces is ensuring that the ODBC drivers are compatible with the Access ODBC interface, which was a big problem in Version 1.0 of Access.

"When we designed Access, we made assumptions about how Microsoft's ODBC group was going to implement the specification, and those assumptions turned out to be wrong," said David Risher, Access product manager at Microsoft. He added that Access 1.1 contains a new ODBC code based on the most up-to-date ODBC specification, ensuring greater compatibility with third-party ODBC drivers.

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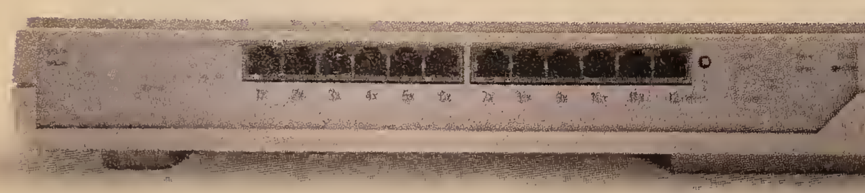

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Borland is scheduled to announce a new product called SQL Link soon that will enable Paradox for Windows users to access a range of SQL databases, including Borland's InterBase, Oracle's Oracle Server, and Microsoft's and Sybase's SQL Server.

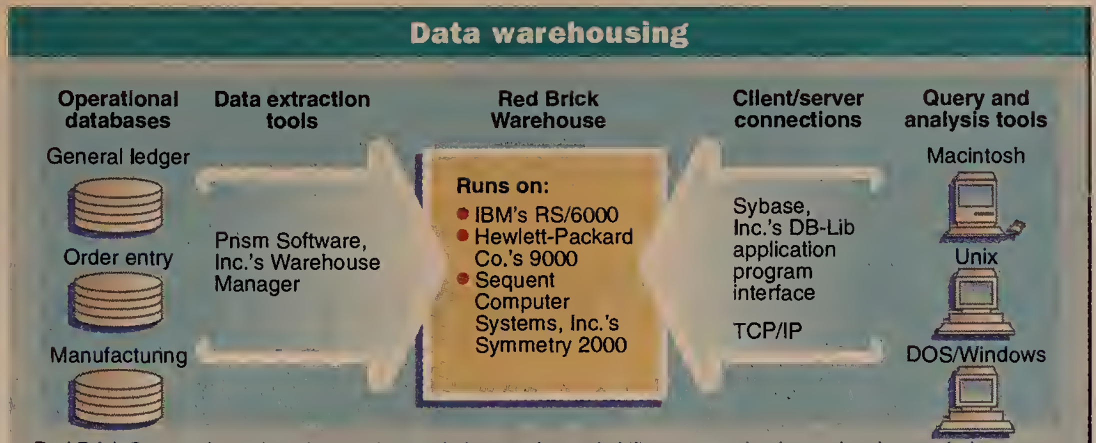
Borland has not deployed SQL Link yet because it is based on its Integrated Database Application Program Interface (IDAPI), a counterpoint to ODBC that is backed by a consortium of more than 40 vendors. The IDAPI is not expected to hammer out a final version of the specification until early in the fall. While SQL Link may be late to market, it will be supported by third-party developers and provide features such as cross-database joins.

Lotus acquired Approach for $20 million and will begin selling the database later this summer once the transaction is finalized.

Approach has won accolades for its ease of use and performance, but, unlike other Windows databases, it does not have a local data store of its own. It uses a proprietary database driver technology, PowerKeys, to access information stored in other databases.

The Approach database will have a difficult time offering the same range of SQL connectivity as Access or Paradox because Lotus will have to build PowerKeys for each SQL database that Approach supports. In contrast, Microsoft and Borland will rely on third-party developers.

SPC offers an option to Superbase, called SQL Library, that contains dynamic link libraries for communicating.SQL Library costs $495 and has been shipping for almost two years. ☒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Prism Software, Inc.'s Warehouse Manager
Red Brick Warehouse
Runs on:
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● Hewlett-Packard Co.'s 9000
● Sequent Computer Systems, Inc.'s Symmetry 2000
Client/server connections
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TCP/IP
Query and analysis tools
Macintosh
Unix
DOS/Windows

Red Brick Systems' warehousing product optimizes end users' ability to query business data by regularly consolidating information from heterogeneous operational databases.

GRAPHIC BY SUSAN J. CHAMPENEY

SOURCE: RED BRICK SYSTEMS, LOS GATOS, CALIF.

Red Brick

Continued from page 35

Software, Inc.'s Warehouse Manager, which extracts and reconciles data before being loaded into the Red Brick Warehouse database (see graphic, this page).

Version 2.0 of Red Brick Warehouse allows companies to create decision-support databases containing up to 75G bytes of data. Previously, Red Brick Warehouse databases could support between 10G and 20G bytes of data. In addition, Version 2.0 supports a selective loading feature, which extracts only the parts of the source databases that have changed since the last extraction.

Version 2.0 also supports new extensions to its RISQL Data Access Language for more efficient querying and analysis capabilities. RISQL is a proprietary implementation of SQL that is optimized to work with Red Brick Warehouse. Users can also employ standard SQL to query the Red Brick database.

The new RISQL extensions enable users to select qualitative subsets within a query, eliminating the need to download an entire result set to sort the data. That reduces the strain on the network and prevents a user from requesting more data than the personal computer's memory can handle. The extensions also allow users to create and store often-used queries and include modifiable parameters that can be changed any time the query is run.

Security has also been improved in Red Brick Warehouse 2.0, allowing administrators to control access to portions of the Red Brick Warehouse database on a table-by-table basis. The product is available now for between $23,000 and $300,000, depending on configuration. ☒

✆Red Brick Systems: (408) 354-7214.

BRIEFS

Continued from page 35

tion between X.400 and SMTP addresses, audit trails and other features.

The software will begin shipping in September. Pricing starts at $8,000, or at $2,000 as an add-on for users of Zoomit's VINES 400 RTS X.400 gateway product.

Zoomit: (416) 866-7442.

Micro Decisionware of Boulder, Colo., and **Trinzic Corp.** of Palo Alto, Calif., last week announced a joint marketing venture under which Micro Decisionware will market Trinzic's InfoHub and InfoPump data access products. The Trinzic products will be sold as an option for Micro Decisionware's Database Gateway product line.

Micro Decisionware: (303) 443-2706; Trinzic: (617) 891-6500.

Object Design, Inc. of Burlington, Mass., announced Version 2.1 of ObjectStore, which adds support for IBM's OS/2 and SunSoft, Inc.'s Solaris 2.1 platforms. ObjectStore currently runs on a variety of Unix platforms as well as Windows 3.1 and NetWare. The Solaris version is available now for $2,500, while the OS/2 version will be available in August for $3,500. An OS/2 run-time version will cost $1,050.

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Editorial

One important publishing rule is to not get too far ahead of readers or you risk losing them. But sometimes it's tough to figure out when you're racing ahead or just keeping pace.

Consider Asynchronous Transfer Mode (ATM). We've chronicled the fits and starts of this technology, but after some recent user site visits, I got to thinking we have been going a little too heavy on the ATM front. Network managers I met with said the trade press has been doing too much flag-waving for ATM and that it just isn't something that has much relevance to their jobs today or in the near future.

This feedback was without prompting. I hadn't asked specifically about ATM, but rather what we could do to improve the publication.

A couple — both involved in advanced LAN internetworking projects — said they'd been hounded by other managers and executives who'd read about ATM and demanded to know why their companies hadn't embraced it.

"People were calling me a moron for having just installed FDDI," one reader told me. "It took me a couple of weeks to convince everyone that ATM was too new and unstable for what we needed. I had to send one guy to a training course just to get him clear on what ATM could and couldn't do."

A couple weeks later, I chaired a Comdex/Spring panel that included user and vendor executives. When asked which technology was being overhyped today, several answered ATM — including the chief executive officer of Banyan Systems, Inc. and a vice president at Wellfleet Communications, Inc.

By then, I was convinced: Ease up on ATM. But shortly thereafter, we held a focus group with users in the Boston area. When asked what they wanted more coverage of, they quickly agreed: ATM. Heads nodded solemnly around the table. Readers, who handled everything from a few internetworked LANs to very large enterprise networks, weren't prompted about ATM either.

How do you reconcile those views? It may be as simple as the old adage: Where you sit depends on where you stand. If you're mired in a major network upgrade, the last thing you want to hear about is the next latest and greatest technology. In strategic planning mode, you want to know about the twists and turns in the road ahead.

I'd like to know where you stand on ATM. Drop me a line.

JOHN GALLANT

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MACROSCOPE

By JAMES KOBIELUS

End-to-end support will require changes

End-to-end network management is a beautiful technocratic ideal, but it is well beyond the reach of most organizations. Totally proactive end-to-end support is feasible only if network managers have up-to-the-minute information on every user, node and circuit as well as established procedures for providing the right assistance at the right time to the right people.

Some network managers like to brag that they do provide end-to-end support, which could be described as the "leave the driving to us" school of customer service. Under this paradigm — propagated by network management consultants and vendors — the user's every need is attended by smiling professionals who have all the necessary information and tools at their fingertips.

ONLY HUMAN

However, nobody would ever mistake the average network manager for the Oracle of Delphi. Usually, we're just harried mortals trying to forge a hasty solution from partial information. Technology changes too quickly for us to feel confident that we are providing the best possible recommendations, solutions or support.

Too often, we feel like monkeys in the middle — lurching wildly between apparently random problems, running a gauntlet of bureaucratic obstacles to implement a solution we pray will work.

Can full-service, end-to-end user support be put into practice in the madcap ad-hocracy of modern corporate telecommunications? Yes, but it won't be easy because we'll have to fundamentally reengineer the tools and processes we use to provide network support.

TOOLS FOR THE TASK

First, to provide end-to-end network management, we need tools that are up to the task: network planning tools, fault-monitoring consoles, inventory management systems, help desk systems, protocol analyzers and the other trappings of the network management game.

Don't hold your breath, however, waiting for the all-encompassing network management environment that will make end-to-end support possible. It may take years for all the necessary network management standards to be defined, engineered into products and made fully operational.

In terms of the ability to support end-to-end network management, the most significant standard will be the Desktop Management Interface (DMI), currently under development by the multivendor Desktop Management Task Force.

DMI will streamline remote management of personal computer resources such as network interface cards, hard drives, processors, random-access memory, operating systems and application software. The standard will be a critical component of end-to-end support because it will enhance network managers' ability to monitor network end points — the terminals — where users do most of their work and from which most problems originate.

Here's how DMI will work. Let's say an end user reports difficulty printing an Excel spreadsheet on a local-area network-connected printer. If the end user's workstation, the print server and the printer run DMI agents, the network administrator would be able to poll all of these devices to see where the job is hung up.

Theoretically, the administrator would be able to tell right away whether the problem is in the application, the end user's physical LAN connection, the network operating system or the printer since current status on all end-device hardware and software would reside in the administrator's Management Information Base.

REDESIGN THE PROCESS

The second and more fundamental way to realize end-to-end support is to reengineer the network management bureaucratic process. Don't invest in any net management tools until you have identified process redesigns that will allow you to fully leverage their capabilities. Bear in mind that automation doesn't necessarily improve anything; it might just give you an automated mess.

The most significant change you can make is to streamline the procedure by which end users' needs, requests and concerns are conveyed to network management staff.

Having a well-developed relationship with your end users will yield infinitely more useful information than any network management tool now or in the future.

How do you start to build a better relationship with end users? Here are some ideas:

- Assign a single point of contact for network support.
- Make placing a service request or trouble report as convenient and simple as possible.
- Assign account representatives who are responsible for knowing what the end users' jobs are and anticipating their needs well in advance of service orders or purchase requests.
- Reward network staff on the basis of initiatives taken and good deeds done for users.
- Let all network support staffers take a turn manning the help desk so they can get first-hand feedback on network and technical staff performance.
- Meet with end users regularly under low-pressure circumstances, not just when they call in with a problem or place a service order.

Most network managers could generate plenty of additional ideas for improving communication with users.

End-to-end network management depends, first and foremost, on your being able to take the user's eye view. Reengineering net management tools and processes is the first step in achieving this goal.

Kobielus, a contributing editor to *Network World*, is a telecommunications analyst with Fairfax, Va.-based Network Management, Inc., a local-and wide-area network systems integrator. He can be reached at (703) 218-4362.

FROM THE EDITOR

By JOHN GALLANT

Putting on a new face

"Life is its own journey, presupposes its own change and movement, and one tries to arrest them at one's eternal peril."

Laurens Van der Post

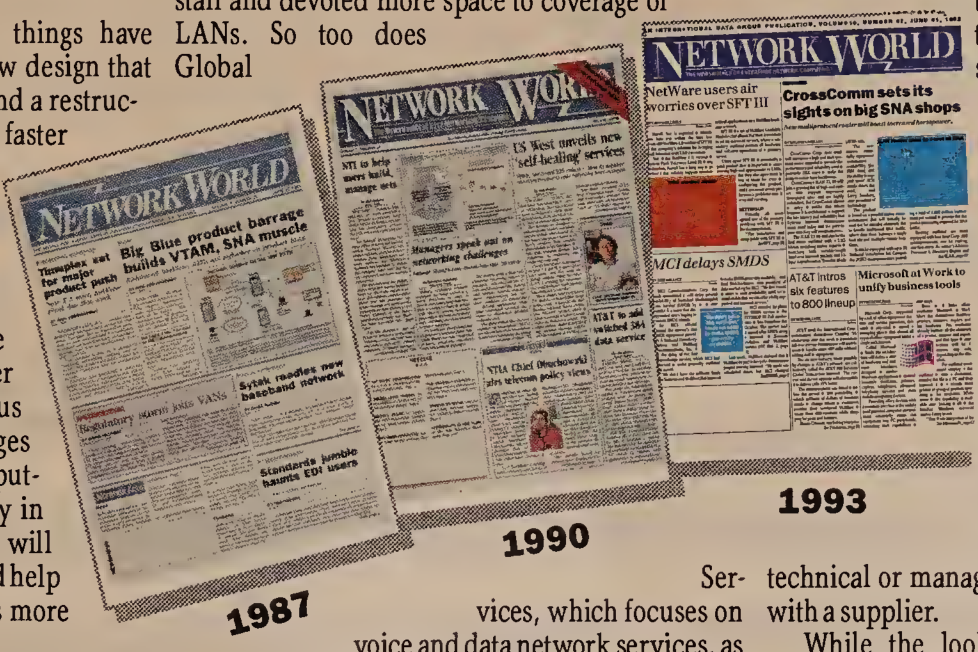
Even a cursory look tells you things have changed. This week, we launch a new design that gives *Network World* a fresher look and a restructuring to help you find information faster and allow us to devote more space to high-priority topics.

This is the first issue produced on a new IBM RISC System/6000-based client/server publishing system we've deployed over the past three months. The move to client/server hasn't been easy, but it's given us invaluable insights into the challenges you face in adopting distributed computing. It's also provided great flexibility in layout, graphics and design, which will make the newspaper easier to read and help us convey complex technology issues more clearly.

We've also consolidated some technical sections to reflect technology shifts and save you time — your most precious resource these days.

The new Enterprise Internets section, which integrates the former Data Net Architectures and Internetworks sections, focuses on the technologies and issues involved in deploying an enterprise data architecture based on LAN internets. This change reflects corporate efforts to blend local-area network and traditional data traffic in a common infrastructure.

Local Networks remains, although we've added staff and devoted more space to coverage of LANs. So too does Global Services, which focuses on voice and data network services, as well as regulatory issues and emerging wireless services.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Big Blue product barrage builds VTAM, SNA muscle
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Microsoft at Work to unify business tools

Client/Server Applications rounds out our coverage of the enterprise network by addressing the challenges of deploying distributed applications and building enterprise messaging and database facilities. It spotlights key technologies, such as distributed databases, electronic mail and work group applications.

While we no longer have the Industry Update and Management Strategies sections, business and management coverage has been integrated into the technical sections to save you time. You won't have to scan one section for LAN product news, for example, and another for business news about companies offering those products.

Along with these changes, we've instituted a new Page Two feature — the Network Help Desk — that builds on our commitment to reader advocacy. Questions submitted to the Network Help Desk will be researched by our staff or tackled by experts in the field. Use the Network Help Desk when you have a tough technical or management question, or a problem with a supplier.

While the look and structure of *NW* has changed, we remain true to our original mission of serving information services professionals building and managing enterprise networks. The changes you see reflect your input, through editoral surveys and other mechanisms, and we hope they make *NW* more useful.

As always, we welcome your comments; let us know what you think.

Letters

Breach of protocol

The issue of performance in the process of internetwork component selection requires a more detailed discussion than that contained in the article "Wellfleet wins router performance crown" (April 26, page 17). Specifically, the article neglected to identify the protocols used in the test.

Different protocols impose various levels of overhead on any network. Some are simple, connectionless datagrams, requiring little or no acknowledgment. Others are connection-oriented and conduct relatively extensive end-to-end communications, increasing network traffic and the amount of processing required by a router.

Routers typically provide varying throughput levels for different protocols, frame sizes and network access methods (such as carrier-sense multiple access with collision detection and token passing). One vendor may do a better job with Internet Protocol, while another may provide superior token-ring support. There is not a level playing field or a single, simple way to identify a winner in all categories of router selection. There are just too many variables.

Buddy Shipley
President
Shipley Consulting International
Silver Spring, Md.

Author's response: The protocols used in the test were the Transmission Control Protocol/IP, Internetwork Packet Exchange (IPX), DECnet and bridging protocols. Please note that the article clearly stated that this was not a comprehensive test and that criteria other than performance results should be considered.

No difference of opinion

The editing that was done on my letter (May 24, page 37) regarding David Ferris' column "Setting up an Internet connection" certainly made it easier for the author to respond. His column contained *errors*, not differences of opinion. Anyway, congratulations on fixing my letter to take some of the steam out of it and to allow him to reply and look more informed than he is.

No one needs to understand the Transmission Control Protocol/Internet Protocol stack in order to use it. What nonsense to indicate otherwise.

He should have said mail from CompuServe takes days; Internet mail does not. I would guess that the mail service for which he is paying is at fault. He should complain.

To say that you have to be concerned with matters such as subnets going down when using TCP/IP shows his lack of understanding. TCP/IP is specifically written so the user does not have to worry about such things at all.

By editing out my comment that Ferris' section on unauthorized access spreads fear where none is warranted, you left that fear in place.

No need to go on further about this, but I don't believe you have shown yourself to be a useful magazine.

Frederick Avolio
Principal analyst
Trusted Information Systems, Inc.
Glenwood, Md.

Show us your passport

In an otherwise informative article titled "ATM may help the PBX realize a long-held dream" (April 19, page 1), you incorrectly described Northern Telecom, Inc.'s recently announced Asynchronous Transfer Mode switch, the Magellan Passport, as "designed to replace the widely used DPN-100 line of high-speed packet switches." In fact, Passport augments the DPN-100 line as a comember of the Magellan family of multimedia communications products.

Northern Telecom continues to enhance the DPN-100 line in terms of scalability and additional features and functions.

J. Michael Camp
Vice president
Magellan Networks marketing
Northern Telecom, Inc.
Durham, N.C.

Signed but not secure

In his response to my letter to the editor regarding electronic signatures (May 24, page 37), Walt Roehr notes the purpose of an electronic signature. His points conform with my understanding. However, one of his comments that needs rephrasing strikes at the heart of the vulnerability of signed electronic messages.

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Smack-dab in the Middle

Three technologies form the basis for emerging middleware, and each offers a new wrinkle for networking applications.

BY WAYNE ECKERSON

There's a revolution taking shape in the networking industry, and a new technology is literally in the middle of the action. Middleware is becoming a technological keystone in the move toward distributed computing.

During the past six months, scores of vendors have repositioned existing products or rolled out new offerings as middleware. These products run the gamut from data access application program interfaces (API) and transaction processing software to object request brokers (ORB).

But more than just the latest buzzword, middleware is a critical component for building the next generation of distributed applications. But what exactly is it?

Middleware is a layer of software that sits between an application and the network, and manages the interaction between disparate applications across the heterogeneous computing platforms.

Most middleware products support a high-level programming interface and a set of services — such as directory, name and authentication — which are critical for supporting and managing complex, distributed computing environments.

The market for middleware products will skyrocket from $50 million this year to more than $1.2 billion by the year 2000.

SOURCE: TUCKER/DEBOEVER TECHNOLOGIES, INC., SOUTH NORWALK, CONN.

Middleware appears destined to become the focal point for integrating heterogeneous computing environments, making it easier for developers to build robust, enterprisewide applications. Middleware basically shields application developers from the complexities of underlying network and operating systems, freeing them to focus on building and enhancing applications.

In the absence of effective open systems standards, users are beginning to deploy middleware tools to build network computing infrastructures — in essence, distributed operating systems — to integrate resources throughout enterprises.

Users are finding middleware tools invaluable in supporting efforts to downsize applications, reengineer business processes, deploy client/server and work flow programs, and better integrate customers and mobile workers into corporate computing environments, among other things.

But before jumping headlong into the market for middleware, users should recognize that the technology is not a panacea for all their computing headaches. Middleware is still relatively unchartered, and many vendors are start-ups with unpredictable futures.

Users also need to distinguish between various middleware technologies, the problems each are best suited to address and the impact each may have on network performance.

FUNDAMENTAL DIFFERENCES

Essentially, there are three fundamental types of middleware: remote procedure calls (RPC), message-queuing software and ORBs. Most commercially available middleware is built on top of one of these three core technologies.

The technologies have slightly different origins, and each has various strengths and weaknesses in supporting distributed applications in heterogeneous computing environments. While technology advocates claim everything can be done with their model, each is uniquely suited to address different integration problems.

RPCs, for example, are best used for linking tightly coupled applications, such as client/server or cooperative processing applications, where integral components of a single program are dispersed across multiple processors. RPCs, which essentially enable one application to execute a function or procedure on a remote computer, perform best when used on high-bandwidth, high-availability local-area networks.

Message queuing, on the other hand, excels at connecting loosely coupled or autonomous applications that span the enterprise. These may be different departmental applications, such as inventory and order processing, that need to share data.

Message queuing allows two or more independent applications to communicate in a peer-to-peer fashion via structured messages that get logged or stored in queues or buffers. Also known as asynchronous messaging, message queuing allows applications to interact in a store-and-forward manner, similar to the way electronic mail is distributed.

ORBs, still very much in their infancy, are similar to message-queuing software but are used within distributed object computing environments in which applications and resources are defined as objects.

ORBs enable objects to interact via messages across a network. They relieve objects of having to know the location or properties of remote objects in order to exchange information with one another.

What also distinguishes these technologies is the degree to which they insulate programmers from the complexities of the underlying network and operating systems environments.

To implement RPCs, application developers generally require more programming skills than for message queuing or ORBs, both of which support high-level APIs. However, message queuing is still a young technology compared to RPCs and needs time to mature, while ORBs require users to understand object-oriented design methodologies, which few do today.

To users, the existence of three middleware types is a plus — it provides more flexibility to deploy tools that best match their networks and application development environments. In fact, most users see RPCs, message queuing and ORBs as variations of the same theme. Indeed, some users will employ the technologies interchangeably, side by side, layered on top of one another within the same application or environment, depending on system requirements.

"You need the flexibility to choose between several different tools when building distributed applications," says David Callingham, director of consulting at the CGI Group in Toronto, who has developed many client/server

Continued on page 44

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applications for users.

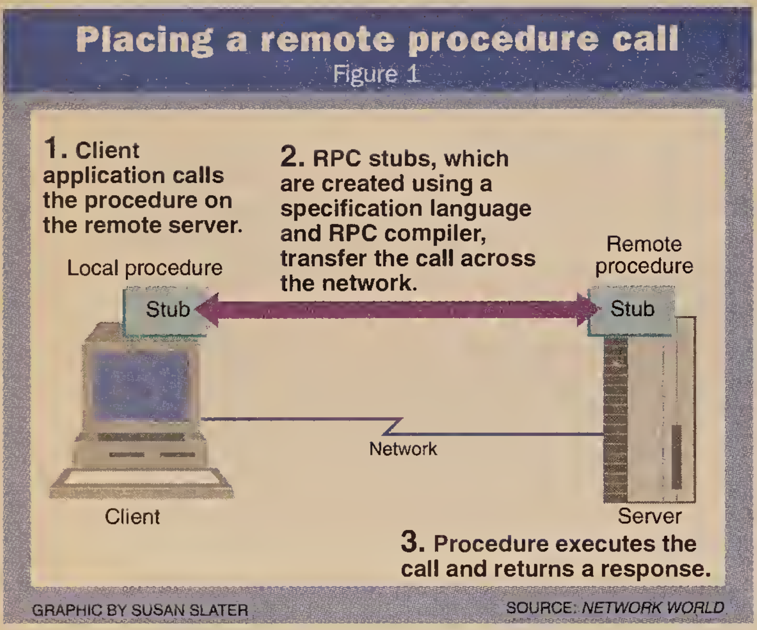
The trick, though, is knowing which technology to use for the particular type of applications being developed and to anticipate the impact of that choice on existing network infrastructures.

TO RPC, OR NOT TO RPC

RPCs were the first of the three middleware technologies to arrive on the scene. RPCs were developed in the early 1980s as a way to break parts off a monolithic program and run them across separate processors on a LAN. The earliest RPCs, such as Sun Microsystems, Inc.'s Sun RPC and Apollo Computer, Inc.'s Network Computing System (now part of Hewlett-Packard Co.'s RPC offering), were used to give groups of programs access to a shared-file system. RPCs were also used to connect programs to database and print servers, as well as to high-speed I/O processors, for executing number-crunching routines.

Placing a remote procedure call

Figure 1


1. Client application calls the procedure on the remote server.
2. RPC stubs, which are created using a specification language and RPC compiler, transfer the call across the network.
Local procedure
Remote procedure
Stub
Stub
Network
Client
Server
3. Procedure executes the call and returns a response.

GRAPHIC BY SUSAN SLATER

SOURCE: *NETWORK WORLD*

RPCs typically are used to link C applications running on Unix platforms, but vendors have extended the tools to work with a variety of operating systems, languages and network protocols. Netwise, Inc. of Boulder, Colo., for example, markets RPC tools for DOS, IMS, Macintosh, MVS, NetWare, OS/2 and Windows, as well as several Unix platforms. The tools work with Transmission Control Protocol/Internet Protocol, NetWare and IBM's LU 6.2 protocols.

With RPCs, application developers issue a function call to a subroutine as if that routine was local. The RPC code, which is attached as stubs to both the requesting and target applications, marshals data and executes run-time routines for sending the data across the network (see Figure 1, this page). In essence, RPCs create a dedicated function between two computers on a network, just as two personal computer components communicate across a system bus.

Major RPC vendors:

- ***Hewlett-Packard Co.***
- ***Open Software Foundation, Inc.***
- ***Netwise, Inc.***
- ***NobleNet, Inc.***
- ***SunSoft, Inc.***

Creating the RPC code, however, is not always straightforward. Programmers use a high-level scripting language to specify data types and structures that cross the wire, and, in some cases, the name and address of the remote node. They then use a compiler to generate the code. With message queuing and ORBs, all developers need to know is the name of an object and a few additional parameters.

With RPCs, programmers also need to know how to bind the function call to the remote procedure, which is especially difficult if the target application was developed with a different programming language and runs on a different operating system and machine architecture.

"RPCs do not hide all aspects of the network. The binding process is too complex for most programmers to master," says John Rymer, vice president at Patricia Seybold Group, Inc. in Boston.

While leading RPC vendors, such as HP, NetWise and Sun have come out with higher level interfaces that hide some of the complexity of using RPCs, the technology is still too cumbersome to win over most users, Rymer says.

The biggest RPC users will be vendors, which will use them as the underlying transport mechanism within distributed computing products, Rymer says. For example, Sun's Sun NetManager and Remedy Corp.'s Action-Request management tools use RPCs under the covers.

"RPCs are good for applications that are tightly coupled and don't change much, such as shrink-wrapped software," Rymer says.

Bill Jacobs, product development manager at Netwise, says the biggest advantage of RPCs is that they make data structures transparent across a network. Data structures often consist of multiple fields and data types, such as customer records. RPCs don't just return raw data to a client application. Rather, they interpret and translate the data so it can be inserted directly into an application in the right format, Jacobs explains.

Beyond programming requirements, RPCs define a call-response method of communications between remote applications that is inherently synchronous. This means the client issues a request and then waits until it gets a response. Response time and network performance are critical because the client workstation is blocked from processing any work until it receives a response. This is typically why RPCs are deployed in high-speed LAN environments, where there is sufficient bandwidth to ensure adequate response times.

RPCs are also connection-oriented, meaning the client can't issue a request unless the target application is available to process it. Thus, RPCs don't work when there is a network failure or a server has crashed or is temporarily unavailable because of a large batch job. This is a major reason why RPCs haven't been deployed across wide-area networks, where the possibility of network outages and unavailable resources is greater.

"One of the drawbacks of RPCs is that they assume the network is always available," says Doug Hartman, director of DCE engineering at Open Software Foundation, Inc. (OSF) in Cambridge, Mass.

But RPC vendors have found plenty of clever ways to circumvent the model's weaknesses. Asynchronous RPCs, for example, enable a client workstation to spin off a separate thread — or processing cycle — which waits for a response from the remote application. This allows the local application to continue processing on the original thread.

Vendors such as Transarc Corp. have also come out with transactional RPCs, which support such techniques as two-phase commit and other transaction processing mechanisms.

Also, many commercially available RPCs allow applications to function as clients and servers interchangeably. This means clients can issue and field requests from servers and vice versa. The OSF's Distributed Computing Environment (DCE), for example, supports a feature called chaining, which enables one server to hand off a client request to another server in real time. Another feature, called referral, allows a server to tell a client to issue a call to another server that can fulfill its request.

The evolution of the RPC model is best seen in the OSF's effort to establish DCE as a standards-based framework for integrating multivendor computing platforms using RPCs. OSF — a consortium of about 350 organizations, mostly vendors — issued DCE source code in January 1992 and has been making significant in toward propagating the DCE as an open systems model for distributed computing. Many users are counting on DCE to take root, and, by all accounts, it is.

Last month, more than a dozen vendors demonstrated interoperable DCE implementations at the OSF's Challenge '93 conference. According to OSF's Hartman, 20 systems vendors, including Digital Equipment Corp., IBM and NCR Corp., now offer DCE extensions to their operating systems, and 20 more will soon follow suit.

MOMS AND APPLE PIE

While the OSF is pushing RPCs, a band of mostly small, start-up companies is getting a strong reception among users for message-queuing software, also referred to as interprogram messaging. Most message-queuing products were developed to address the systems integration needs of large companies that are saddled with islands of incompatible computing systems.

What distinguishes interprogram messaging from RPCs is that messaging products have high-level APIs that generally consist of about four commands and a dozen or so error conditions. The messaging products also employ queues, or buffers, to log or hold messages on their way to their destinations.

The high-level API shields programmers from the complexities of underlying network protocols and operating system environments. It also gives programmers much greater flexibility to control the way two applications interact. For example, message-queuing supports asynchronous, synchronous and conversational modes of interapplication connections. It also allows users to broadcast messages to all nodes on a network and multicast messages to a predefined mailing list.

Message queuing allows users to mix and match communications modes within a single or extended transaction. For example, brokerage houses and banks may use messaging to handle a customer order to purchase stock. To execute the trade, a message is sent in synchronous mode from an order entry terminal in the brokerage firm to a computer on the stock exchange floor.

Once the trade is executed, usually within seconds or minutes, a message is automatically returned, notifying the broker and immediately updating the customer's account. This event triggers a third message, which is queued and sent to the bank's mainframe at the end of the day to update the brokerage firm's balance sheets.

Queues enable messaging products to guarantee message delivery even if there is a network or node failure. Messages are simply stored in a local or remote queue until the application is available and delivered.

The queues also enable messaging products to prioritize incoming messages so that high-priority items are delivered first. In addition, most messaging products can route messages between multiple nodes, regardless of network protocols, calculating the most efficient path to get between two end points.

Interprogram messaging, like E-mail, uses a store-and-forward mechanism to send messages between applications. But unlike E-mail, interprogram messages consist of packetized, structured data with header information that tells the receiving application what to do with the data. In contrast, E-mail messages consist of unstructured data, such as text, audio and video.

Unlike RPCs and ORBs, interprogram messaging is best used to connect loosely coupled applications. This makes messaging the tool of choice for building complex work flow programs and integrating departmental applications — such as shipping, inventory and purchasing — within a just-in-time manufacturing or delivery environment, says Max Dolgicer, director of network applications at Tucker Network Technologies, Inc. in South Norwalk, Conn.

Interprogram messaging also excels at interconnecting a company with its customers and trading partners. J.P. Morgan & Company, Inc., for example, uses Systems Strategies, Inc.'s ezBridge Transact message-queuing software to electronically link five of its largest customers and dozens of internal departments to its cash and security settlement systems in New York (see Figure 2, page 45).

John Bodamer, vice president of systems development at J.P. Morgan, says ezBridge Transact's store-and-forward properties decouple application processing from communications. This allows both J.P. Morgan's and its customers' cash or stock settlement programs to continue processing even if the other side is unable to transmit. "We just queue up the messages until the customer is available," he says.

The problem with interprogram messaging is that it is so new that most vendors — with the exception of IBM and DEC — are start-ups with fewer than a dozen employees. While users are eager to deploy interprogram messaging, most are leery of using tools from companies that may not be around in a year or two.

Baxter Healthcare Corp. plans to deploy middleware in the near future, but it will add a layer of software between the vendor's package and Baxter's applications. The layer of software — which is, in effect, another API — will insulate Baxter's applications from changes in commercially available middleware. This minimizes the risk of buying new technology from small firms that may go bankrupt or whose products have not yet completely stabilized.

"Interprogram messaging, while valuable, is extremely new, and it's not clear how the products will shake out in the marketplace," says Mike Purcell, staff software engineer at Baxter in McGaw Park, Ill.

Message-queuing vendors are working to address users' concerns. To start, most are adding a variety of upper-level services, such as distributed directories, network management capabilities and security, to beef up the robustness and stability of their products.

In addition, seven of the vendors — Covia Technologies, Inc., DEC, Horizon Strategies, Inc., IBM, Momentum Corp., PeerLogic, Inc. and Systems Strategies — met last month for the first time to discuss ways they could further educate the market about interprogram messaging. These vendors also dubbed the technology class message-oriented middleware (MOM) to distinguish their products from other forms of middleware.

It appears this group could turn into a formal alliance comprising dozens of vendors and users of message-queuing technology. What's significant is that the group has already begun discussing the possibility of establishing a standard API that would make their products portable across different user implementations. This would enable users to swap out one middleware product for another without making changes in their applications.

Message-queuing vendors:

- ***Covia Technologies, Inc.***
- ***Creative Systems Interface, Inc.***
- ***Digital Equipment Corp.***
- ***Horizon Strategies, Inc.***
- ***IBM***
- ***Ideas, Inc.***
- ***Momentum Software Corp.***
- ***PeerLogic, Inc.***
- ***Suite Software, Inc.***
- ***Systems Strategies, Inc.***

"A common API would make it easier and less risky for users to deploy MOM technology," says Bob Marcus, coordinator of object-oriented technology at Boeing Computer Services in Bellevue, Wash.

THE OBJECT PARADIGM

One of the benefits of message-queuing software is that the technology is here and available now from several vendors. This is not true with ORBs, although that is about to change. Many vendors are scheduled to release full-fledged ORB implementations this year.

An ORB is software that manages the exchange of messages between objects across a network. Like any type of broker, it functions as the middleman between two entities that want to conduct business. Simply, the ORB fields requests from client objects, finds and invokes the remote objects that can fulfill those requests, and then passes the results back to the respective client objects.

Like RPCs and message-queuing tools, ORBs hide the complexity of accessing remote applications or objects. Objects only need to know the name of the object they wish to invoke and supply some parameters — such as commands — and the ORB handles the rest.

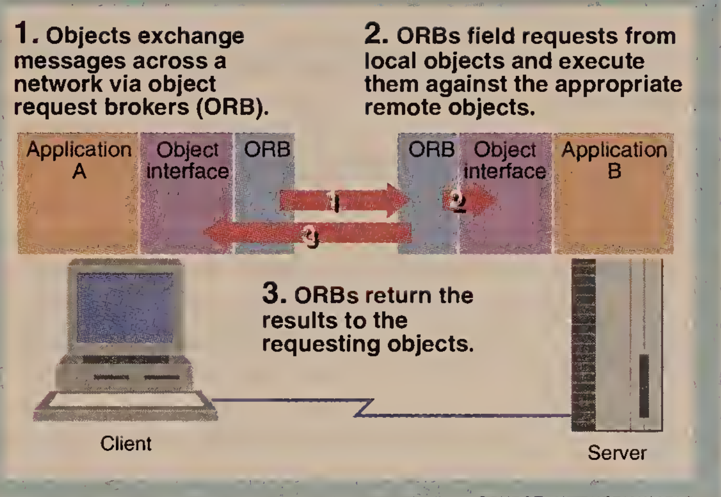
ORBs define a request response method of communications that is inherently synchronous. In fact, most ORB implementations on the market today use RPCs as an underlying transport mechanism for managing interactions between networked objects. However, there is no reason why an ORB couldn't use message queuing, shared memory, Sockets or other communications methods to support interobject communications.

An ORB supports a high-level API that enables objects to exchange information across a network. Currently, the Object Management Group (OMG), a consortium of about 400 vendors, has specified a standard API by which clients can access ORBs. This API is defined in Version 1.0 of the OMG's Common ORB Architecture (CORBA).

However, while ORBs exhibit many of the same characteristics of RPCs and message-queuing software, they arise from a fundamentally different paradigm: object-oriented programming methodologies.

Object-oriented programming enables users to develop software as modular components that can be reused. This speeds application development dramatically, especially as programs grow in complexity and size. Object-oriented programming tools are now being used by most major software vendors to streamline the task of building programs that often exceed one million lines of code.

The object of ORBs
Figure 3


1. Objects exchange messages across a network via object request brokers (ORB).
2. ORBs field requests from local objects and execute them against the appropriate remote objects.
Application A
Object interface
ORB
ORB
Object interface
Application B
1
2
3
3. ORBs return the results to the requesting objects.
Client
Server

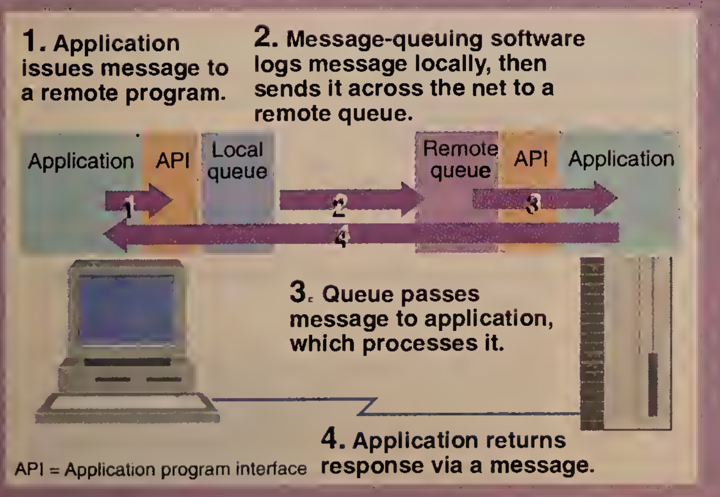
GRAPHIC BY SUSAN SLATER

SOURCE: *NETWORK WORLD*

Objects consist of data and the basic functions or operations used to manipulate that data. Developers can change the contents of an object without affecting other objects or the way they communicate. This eases application maintenance by allowing users to do such things as swap out databases, deploy new network protocols or move applications to other machines without having to rewrite code to work with a different platform.

Objects also hide or encapsulate their contents behind a simple interface that is understandable to all objects. Encapsulation allows users to integrate legacy applications within object-oriented environments, which helps users downsize applications gracefully at their own pace. This can be accomplished by placing an object interface on top of legacy applications or rebuilding the foundation of the legacy application using object-oriented design methods.

Routine message queuing
Figure 2


1. Application issues message to a remote program.
2. Message-queuing software logs message locally, then sends it across the net to a remote queue.
Application
API
Local queue
Remote queue
API
Application
1
2
3
4
3. Queue passes message to application, which processes it.
4. Application returns response via a message.
API = Application program interface

GRAPHIC BY SUSAN SLATER

SOURCE: *NETWORK WORLD*

"You use ORBs when you want to employ object-oriented programming techniques," Seybold Group's Rymer says.

ORBs sit at the core of a class of products called distributed object management systems (DOMS), which systems vendors are just now bringing to market. Some of the biggest vendors in the computer business — DEC, HP, IBM and NCR — as well as scores of smaller companies have already announced or shipped DOMSs.

One of the first companies to announce and ship a DOMS is HyperDesk Corp., a Westborough, Mass., start-up that was founded by more than a dozen former employees of Data General Corp. HyperDesk's DOMS, called HD-DOMS, layers a set of services, including authentication, directory and repository services, on top of the basic ORB engine.

Boeing Computer Services is testing the viability of integrating HD-DOMS with tools from other vendors in order to build work flow applications, document management and database replication services, among other things.

Paul Murray, a systems analyst at Boeing, says the company is closely watching the kind of performance and response times HD-DOMS and other DOMS offer. "One of our major concerns is network performance," he says.

DOMS, in general, are layered on top of software that is not object-oriented, which adds significant overhead and bogs down performance, Rymer says. For example, few of the commercially available ORBs are fast enough to manage messaging between very small distributed objects, such as integers. These performance issues are the reason why few DOMS have been used to support transaction processing environments. In general, DOMSs are used to support messaging between large objects, such as applications and databases, he says.

However, according to Rymer, DOMSs services will eventually be embedded within object-oriented operating systems, such as Microsoft Corp.'s upcoming Cairo or Taligent, Inc.'s Pink, which should ease performance problems.

Besides performance limitations, most DOMSs don't scale well to enterprise networks right now. That's primarily because the technology is so new and because most DOMSs use RPCs, which, as discussed earlier, are not well suited for use over WANs. Until DOMSs replace RPCs with message queuing or some other transport more amenable to wide-area communications, their ability to support enterprise-wide applications is limited.

Despite these limitations, ORBs will ultimately succeed or fail based on the degree to which the computer industry embraces object-oriented methodologies. Some believe that object-oriented programming will go the way of artificial intelligence — an overhyped technology that failed miserably in the general marketplace. However, others believe that the increasing complexity of developing software and distributed computing applications will force users to make the paradigm shift from procedural programming to object-oriented development and ORBs.

DISTINCT YET CONVERGING

It's clear that RPCs, message queuing and ORBs will each play a significant role in helping users build and manage a variety of distributed applications.

While the technologies overlap in the kinds of functions and features they support, each offers distinct advantages for building different types of distributed applications.

Interestingly, however, all three may soon converge in the types of functionality they offer and standards they support. This is because users are pushing vendor consortia, namely the OSF and OMG, to broaden the scope of their distributed computing environments to support additional middleware technologies.

Top among users' concerns is the lack of support for message queuing within OMG's CORBA and OSF's DCE.

"There is concern among users within the OMG that asynchronous messaging is not high on OMG's priority list of services to define," says Paul Engelbarth, senior systems analyst for Deere & Co. in Moline, Ill., who is Deere's representative to the OMG. Others have expressed similar sentiments regarding DCE.

Chris Stone, the OMG's president, says there is a 50% chance that the OMG will define asynchronous messaging in the first round of object services it is scheduled to define during the next six months to a year. Engelbarth and other users say they plan to work with the newly formed MOM Alliance to establish asynchronous messaging standards that can be incorporated as an object service within CORBA.

Meanwhile, some message-queuing vendors have said they will eventually transform their products into CORBA-compliant ORBs. "We have been positioning ourselves all along to move into the object-oriented arena," says Hub Vandervoort, president of Horizon.

The only thing Horizon would have to do to turn its product, Message Express, into a CORBA-compliant ORB is to modify the product's API and adopt object-oriented semantics.

The OSF is currently working out a timetable for adding objects and message-queuing capabilities to DCE. OSF's Hartman says DCE will likely follow the lead of the OSF's Distributed Management Environment, whose overseers recently voted to implement a CORBA-compliant object broker to drive the management framework.

Adding support for objects is OSF's top priority for DCE, followed by support message queuing and transaction processing, according to Hartman. However, OSF is unlikely to take the lead in specifying a standard implementation of these services, he adds. "We are a consensus body, and we move at the pace dictated by our members," Hartman says. "Ideally, we would like the market to decide which implementations are best, and then we will incorporate them."

Object request broker vendors:

- ***Digital Equipment Corp.***
- ***Hewlett-Packard Co.***
- ***HyperDesk Corp.***
- ***IBM***
- ***Iona Technologies, Ltd.***
- ***SunSoft, Inc.***

According to most observers, it will take several years for the distributed computing market to mature and evolve. Now it's too early to tell which middleware technology — RPCs, message queuing or ORBs — will prove most compelling to users.

What is clear is that as distributed computing becomes rooted in the information systems shops of corporate America, middleware will become less of a buzzword and more of a critical set of tools for building mission-critical, distributed applications.

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Letters

Continued from page 41

He states, "The purpose of an electronic signature is to assure the recipient that the entity signing the transmission actually originated it."

His example notes that John Doe might retransmit something someone else has sent but strip the original signature and append John Doe's signature to it. Mr. Roehr's statement should, therefore, be changed to say, "The purpose of an electronic signature is to assure the recipient that the entity signing the transmission actually was the *last* to send it."

Because electronic signatures are most often implemented as appendixes to text messages, they can be easily stripped off, the original text modified and the message signed using the signature of the last entity to modify it.

This vulnerability of signed electronic communications needs to be emphasized strongly. Otherwise, users may believe that their signed electronic transmissions are "secure."

Craig Paul
Wide-area network specialist
Kansas University
Computer Center
Lawrence, Kan.

Language barrier

It is a paradox that some of the worst communication is practiced by the communications industry. The language of this industry has become saturated with acronyms and abbreviations that few understand outside the industry.

Many users hesitate to buy when they feel confused. Yet it often appears that the communications industry has confusion as its goal.

The list of acronyms that are impossible to pronounce is only growing. ISDN, SNMP, FDDI, DBMS, SNA, ATM, RBHC and TCP are only a few examples. Some industrywide terms are even worse, such as T-1, V.32 and V.42. Terms such as LAN and WAN aren't quite as bad; at least they can be pronounced.

There is even reason to question whether telecommunications professionals understand their own terminology. The editor of a European communications magazine recently told me his magazine distributed a questionnaire about industry terms. A prize was offered to the person who could decipher the most terms. The winner was the only person who correctly interpreted more than 50% of the terms.

Have we become unwilling to admit that the terminology has become confusing even to ourselves, thinking that we may appear less professional to our peers and customers if we do not fill our conversation with the most incomprehensible abbreviations?

Cellular telephone has become one of the most successful segments of the communications industry. How well would this service have sold if it had been called something like MVTM (Mobile Voice Transfer Mode) rather than cellular or mobile telephone?

Many customers see a red flag when they are being exposed to a confusing or incomprehensible sales pitch. Do your own customers hesitate due to confusion over the incomprehensible language that has become standard communications industry terminology? Could you be losing sales because your own customers do not understand what you are talking about?

Roald Steen
Correspondent
Telecom Revy, Norway
Woodbury, Minn.

Help desk

Continued from page 2

cycles through the CPU. However, the disadvantage of bus mastering is that when you add fast bus mastering devices to a fast server, there is an increased need for time-critical arbitration to access and control the bus. The faster the devices, the more likely they will expose different interpretations of the EISA specification. Disabling bus mastering lessens the problem but is obviously only a short-term solution. Our engineering group is working on a new driver that should solve the problem. We will send you an early version of the driver to see if it takes care of your situation.

Is there a complete specification written for X.500 yet? Also, is there a book that addresses X.500's future?

Gary Moore, Fort Worth, Texas

Daniel Blum, a principal with Rapport Communications in Takoma Park, Md., responds:

The first version of the X.500 standard for electronic directory services was produced in 1988 by the Consultative Committee on International Telephony and Telegraphy and the International Standards Organization. It included lookup and update mechanisms for the standardized electronic directory but lacked standardized provisions for access control of directory information and for automatic replication of directory entries between servers.

In 1992, the CCITT and ISO issued a new X.500 standard with access control and replication. This standard is technically stable and complete. Vendors are preparing to implement it by participating in various workshops to ensure that implementors have a common understanding of the standard. Users should employ X.500 products based on the 1988 standard where it makes sense and plan for the deployment of X.500 implementations based on the 1992 standard as they become available.

There is also a book available about X.500 called The Little Black Book *by Marshall Rose.*

I need to create a network news server on an Apple Computer, Inc. Quadra 700 running A/UX 3.0. Apple claims that I can obtain the server software to access Usenet from the Internet. How do I this?

Carlton Suber, Rosslyn, Va.

L. Stuart Vance, vice president of engineering for TGV, Inc., a networking software company in Santa Cruz, Calif., replies:

Most Unix systems ship with Usenet news (also known as network news) software that can pick news off of Usenet. A/UX, however, does not. But if you have Internet access, there are a couple of different news servers for A/UX that you might want to check out via anonymous File Transfer Protocol (FTP). The first is pub/inews16j2.tar.Z on the host jagubox.gsfc.nasa.gov. It is a compressed Unix tape archival file, called a tar file, containing the mini-inews V1.6 news package. You might also want to check out pub/FAQ.aux, a file of frequently asked questions about A/UX on the same host. The second server is pub/nntp.159.tar.Z on the host afsg.apple.com. It is a compressed tar file containing a Network News Transfer Protocol server for A/UX. You might also check out the directory networking/news/cnews on the host ftp.uu.net. It contains the latest release of the C News news system. It shouldn't be too difficult to build C News on A/UX. ◻

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NETWORK WORLD TEST ALLIANCE

Help for a pain-free NetWare 4.0 upgrade

CONTINUED FROM PAGE 1

On top of that, you have to decide whether to migrate to NetWare 4.0 all at once — something Novell recommends against — or have it coexist with older versions during the cutover.

Yet the idea of going through an arduous planning process should not frighten you away from upgrading. The benefits of going to NetWare 4.0 are just too substantial to ignore.

The most visible and talked about benefit is NetWare Directory Services (NDS), which replaces the old NetWare bindery directories on each server with a network-wide distributed directory database. NDS simplifies access to network resources. Older NetWare versions require clients seeking access to a particular resource to log on to the server with that resource. With NetWare 4.0, clients log on to a single server and can access resources on any other server, as long as they have access rights.

NDS includes a Bindery Migration feature that enables users to load bindery information from older NetWare servers into the NDS database. NDS also has a Bindery Emulation feature that enables NetWare 4.0 to work with older versions.

Other beneficial NetWare 4.0 features include two options for performing physical software upgrades and several new or enhanced administration utilities. The server component of NetWare 4.0 now supports such key features as memory protection, which is designed to eliminate the nagging problem of NetWare Loadable Modules (NLM) crashing the server, and improved data storage options.

Novell totally rearchitected client software for NetWare 4.0. The new client code has been broken into a dozen different modules that enable administrators to configure clients with only those functions they will need to access desired NetWare services, thus freeing up client memory.

Other improvements include support for larger Internetwork Packet Exchange (IPX) packets and a Packet Burst feature that improves throughput by speeding delivery of packet receipt acknowledgements. There is even a new CDROM-based installation procedure and on-line documentation (see story, page 51).

To conduct testing, Focus Software installed NetWare 4.0 on two file servers and evaluated it in conjunction with three other NetWare file servers running NetWare 3.11, 2.2 and 2.15 as well as two NetWare 4.0 clients (see graphic, this page).

NDS

Testing showed that learning to use NDS will likely be the greatest challenge in the upgrade process. NDS enables users to build a single, global database in which information about users and resources in a large enterprise network are stored as objects.

These objects logically separate users and resources from servers. Users can be grouped together according to the resources they use, and the resources can be named independently of the servers where they physically reside.

For instance, printers, print servers and print queues are defined separate from servers in NDS. Users connect directly to the printer, print server or print queue and do not need to know which server it is on. This may be a lot more straightforward for new NetWare users but will likely confuse users of existing NetWare releases.

The NDS database can be broken into many smaller pieces and distributed across multiple servers. NDS includes a replication feature that enables users to have a backup copy of director of data stored on different servers to prevent the loss of one server from blocking access to critical network resources.

New features and enhancements found in Novell, Inc.'s NetWare 4.0 have ballooned the code enough to require at least 55M bytes of hard disk space and 8M bytes of RAM. In contrast, NetWare 3.11 requires at least 10M bytes of hard disk space and 4M bytes of RAM.

The database is hierarchical, like file system directories, although the naming syntax is more elaborate. NDS names are based on the famously complicated CCITT X.500 directory standards, which break names into four parts of as many as 64 characters each. The parts are separated by a period. The common name (CU) part identifies a user or resource while the organizational unit (OU) part identifies the part of an organization that user or resource is associated with. The organization (O) part is typically the name of the organization and the country (C) part identifies which country the organization is in. A typical X.500 name appears as: CN=SMattin.OU=Engineering.-O=FOCUS.C=US.

NDS allows the use of multiple organizational parts, making NDS names potentially longer than X.500 names in very large organizations. Yet use of the organizational unit and country parts is optional, making it possible for small organizations to keep names simple. The acronyms used to associate the characters that follow it with the correct part of the name can be optional.

In most cases, it is not necessary, or advisable, to use every available part or the acronyms in NDS. A typical NDS name could be as simple as: SMattin.Engineering.Focus. This name leaves off the country part and is a lot easier to swallow — and type — than the more formal X.500 name.

Unfortunately, the acronyms may be required when users try to reach a resource outside their organizational unit. If the organization part is left off, the acronyms prevent NDS from interpreting the country part as the organization part when it searches for instructions on how to rearch the user or resource.

Attempting to make life a tad easier, Novell permits the use of aliases in place of X.500 names. An alias enables users to type in a simple name such as "My Printer". NDS converts that name to the more complex X.500 format.

One major NDS limitation is the difficult task users must go through to modify the naming hierarchy once it is in place. It is possible to move resources or users from one organizational unit to another, but there are no facilities for moving organizational units or copying any kind of object as a model for a new object, such as modeling the name for a new printer after the name for an existing one. In general, making modifications to the database means creating new objects and deleting old ones. This could become tedious, especially in organizations that undergo constant change.

Using NetWare 4.0's Bindery Migration feature, names from binderies are automatically listed in the NDS database without modification and are assigned to the same organizational unit as the NetWare 4.0 server.

NDS places few restrictions on name components, which can include spaces, all sorts of punctuation and even multiple-byte Unicode characters. However, the requirement to be backward compatible with previous NetWare releases and the Bindery Migration feature restricts the full exploitation of this flexibility. For instance, users with NetWare 4.0, 3.X and 2.X servers in a network would be better off respecting the naming restrictions of the bindery, which is not hierarchical.

MIXING NETWARES

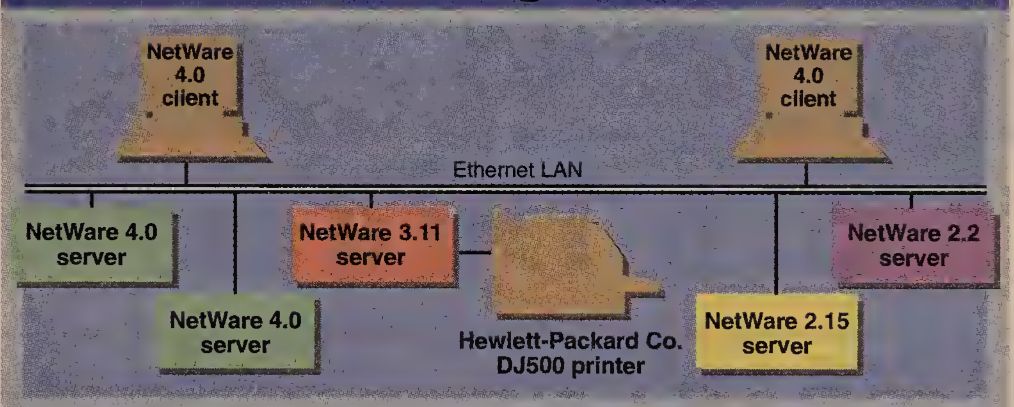
Testing showed that Bindery Emulation features provided in both NetWare 4.0 client and server software makes it easier to link NetWare 4.0 clients to such resources as a printer on older NetWare servers and vice versa.

Bindery Emulation indeed enables workstations running older NETX NetWare client software to access NetWare 4.0 servers and workstations running NetWare 4.0 client software to access older NetWare servers.

However, NetWare 4.0 restricts the functionality of interactions between the various versions of NetWare by performing

Continued on page 48

Test configuration



Testing shows upgrading all workstations to Novell, Inc. NetWare 4.0 client software simultaneously is a good strategy. NetWare 4.0 client software enables workstations to tap resources on NetWare 4.0, 3.11, 2.2 and 2.15 servers, and gives users the option of slowly migrating servers to NetWare 4.0 or retaining a mix of new and old NetWare servers.

GRAPHIC BY SUSAN SLATER

SOURCE: FOCUS SOFTWARE, INC., SALEM, N.H.

Continued from page 47

translations between bindery and NDS information.

This means, for instance, that NetWare 4.0 users are limited to older NetWare functionality when accessing older servers.

This significantly complicates the management of NDS databases and NetWare 4.0 servers because applications need to know whether they are talking to an NDS-based server or a bindery-based one and behave appropriately. This is not transparent to administrators or users. Administrators must manually configure NetWare 4.0 servers to accept commands from older NetWare clients, and NetWare 4.0 clients require the use of a separate set of options to reach older NetWare servers.

Another important aspect of NDS is new auditing features that enable administrators to assign one or more auditors to track network usage patterns for security breaches.

A wide variety of events can be set to trigger entries in audit logs, including accesses to particular files or directories, server operations such as reboots or NLM changes, and security related events such as failed passwords (*NW*, April 26, page 40).

UPGRADING

Users have two options when physically upgrading older NetWare servers to NetWare 4.0: an in-place upgrade (also referred to as "same-server" in NetWare documentation) or an across-the-wire upgrade. With an in-place upgrade, administrators install NetWare 4.0 on older NetWare server hardware. During the process, bindery information is imported into NDS. Upgrading a 2.X server this way entails first upgrading it to 3.11 and then to 4.0 because 4.0 improves on 3.11's file system, which is totally different from 2.X's file system.

In-place upgrades are fraught with danger because there is the possibility of permanently damaging the server if something goes wrong, as it inevitably will. In fact, one attempt at an in-place upgrade of a 2.15 server resulted in an unexplained hard disk failure.

At the very least, you should have a complete, verified backup of the existing server software before attempting this type of upgrade.

The across-the-wire option is a much safer bet. In this procedure, NetWare 4.0 is installed on new server hardware and bindery information from older NetWare servers is retrieved across the network using the Bindery Migration utility. This allows individual users and their data to be migrated to the new server after the client software is upgraded. If printers will be moved from the older NetWare server to the NetWare 4.0 server, then a NetWare 4.0 PUPGRADE NLM is used to convert bindery-based printer configurations to the new NetWare 4.0 printer scheme.

In general, it is worthwhile to invest in new, more capable server hardware to run NetWare 4.0. You can transfer users to the new server and retire the older server hardware or put it to a different use.

UTILITY CHANGES

Administrators will find a bevy of new utilities in NetWare 4.0 as Novell made a valiant attempt to rationalize the seemingly random collection of programs used to administer existing NetWare versions. The good news is that Novell reduced the overall number of utilities. For instance, the number of workstation utilities was reduced from 58 to 32 by combining functions of older utilities with new ones.

There are also a few new powerful utilities, such as the Microsoft Corp. Windows-based Network Administrator and corresponding DOS-based NETADMIN. Both can perform a lot of the old administrative tasks as well as new ones.

Non-Windows users can perform most of their network drive and printer configuration tasks with the new NETUSER utility, instead of learning all the DOS command-line utilities of previous releases.

The bad news is that NetWare 4.0 still contains a bewildering number of utilities. NetWare 4.0 utilities are a great leap forward in usability, but Novell still has a long way to go.

SERVER CHANGES

There are also many significant changes and enhancements to the server capabilities in NetWare 4.0. Memory allocation has been significantly simplified through the use of a single memory pool that enables NetWare to grab the memory needed to carry out functions, such as application processing and core NetWare operations.

With NetWare 3.X, users have to create multiple memory pools that reserve memory for specific functions. However, one pool cannot borrow unused memory from another in order to carry out a function. Instead, users get an error message reporting there is not enough memory to perform the function.

In addition to eliminating spurious out-of-

Continued on page 51

Correction: Due to a data entry error, the Buyer's Guide to inverse multiplexers (May 17, page 41) failed to mention that Tylink Corp.'s SNS 4000 includes an integral bit error rate tester and channel service unit.

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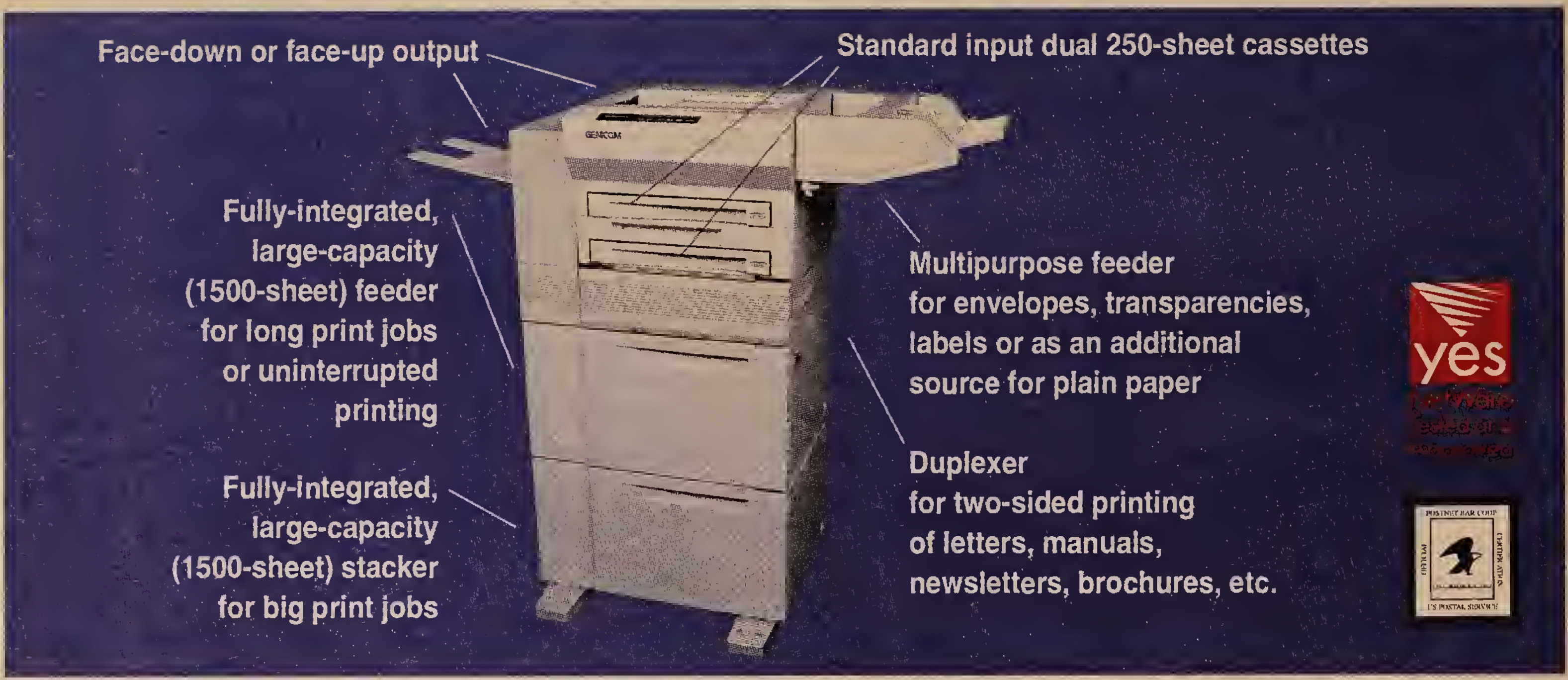
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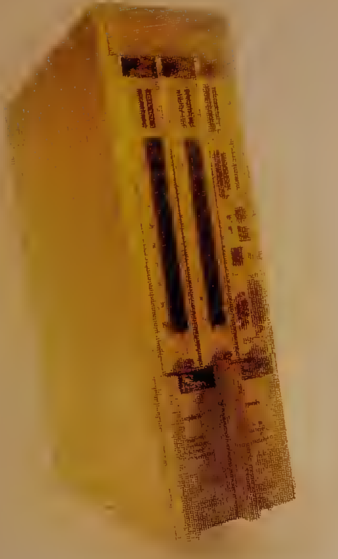

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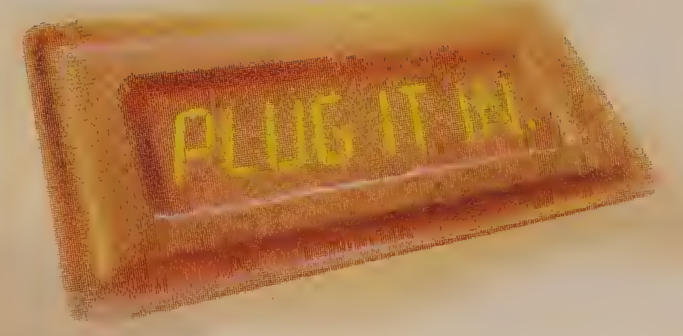

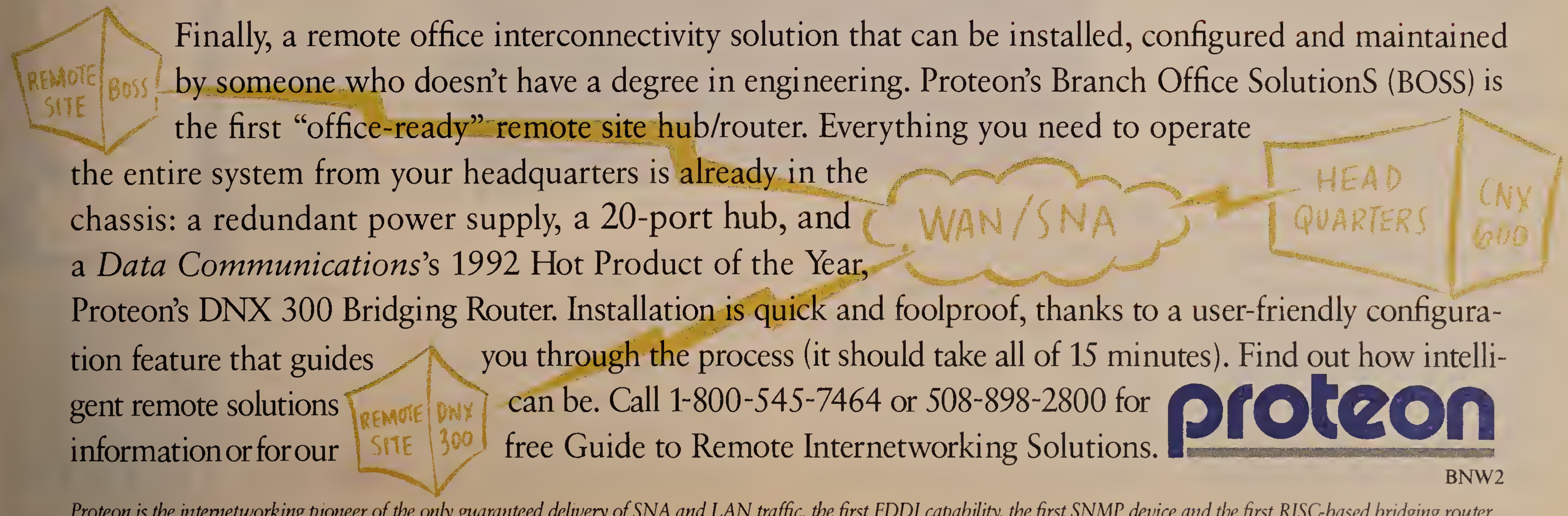

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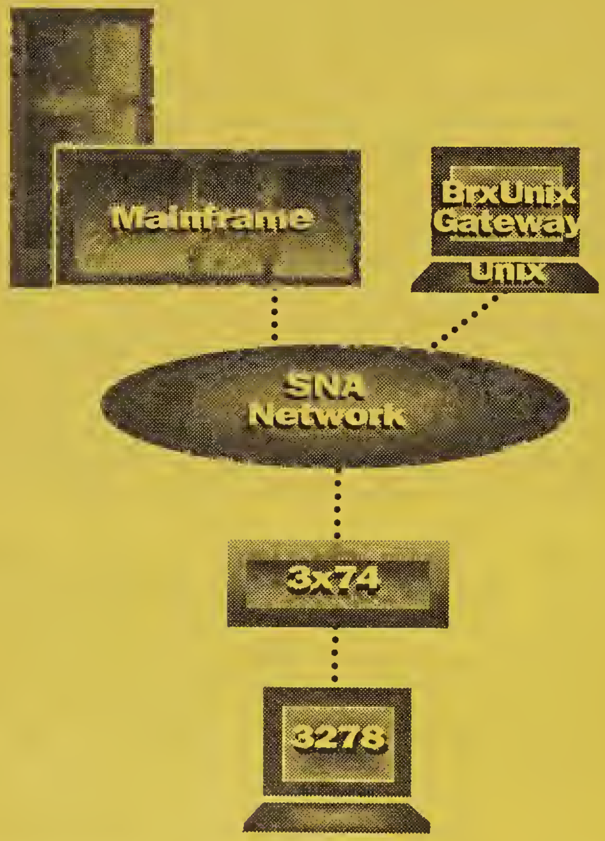

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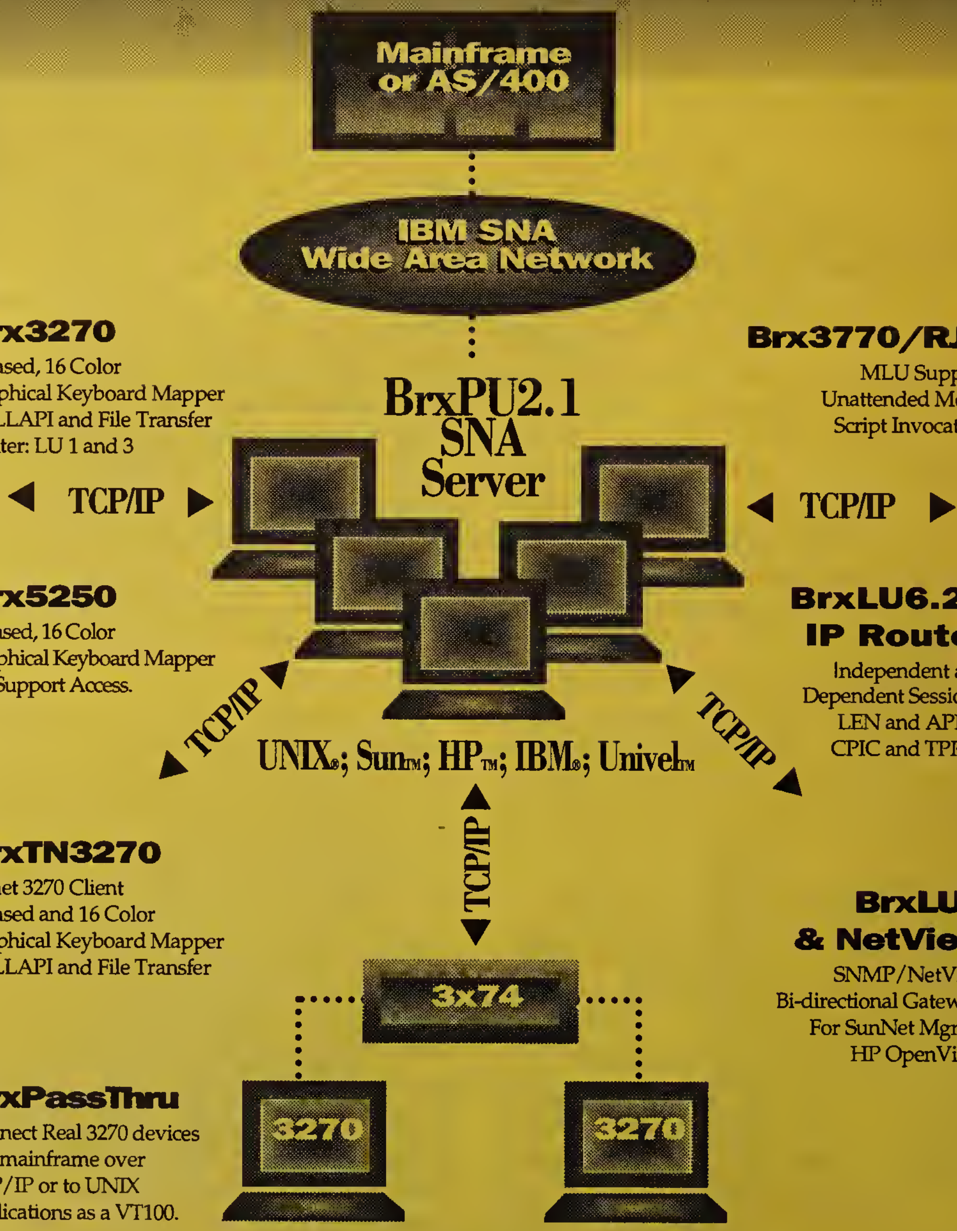

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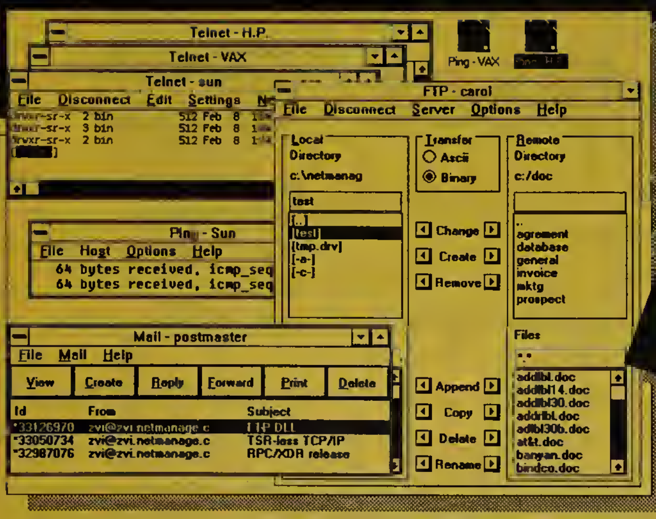

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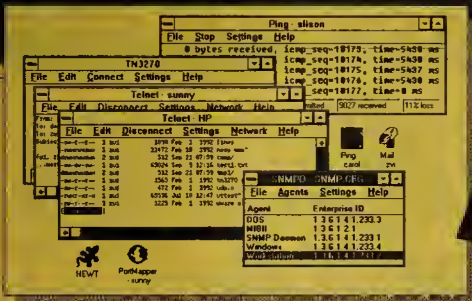

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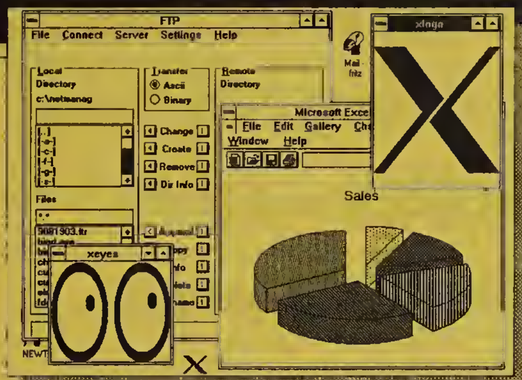

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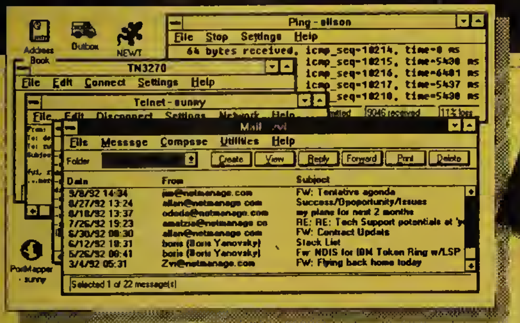

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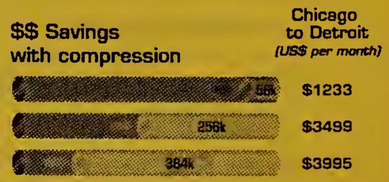

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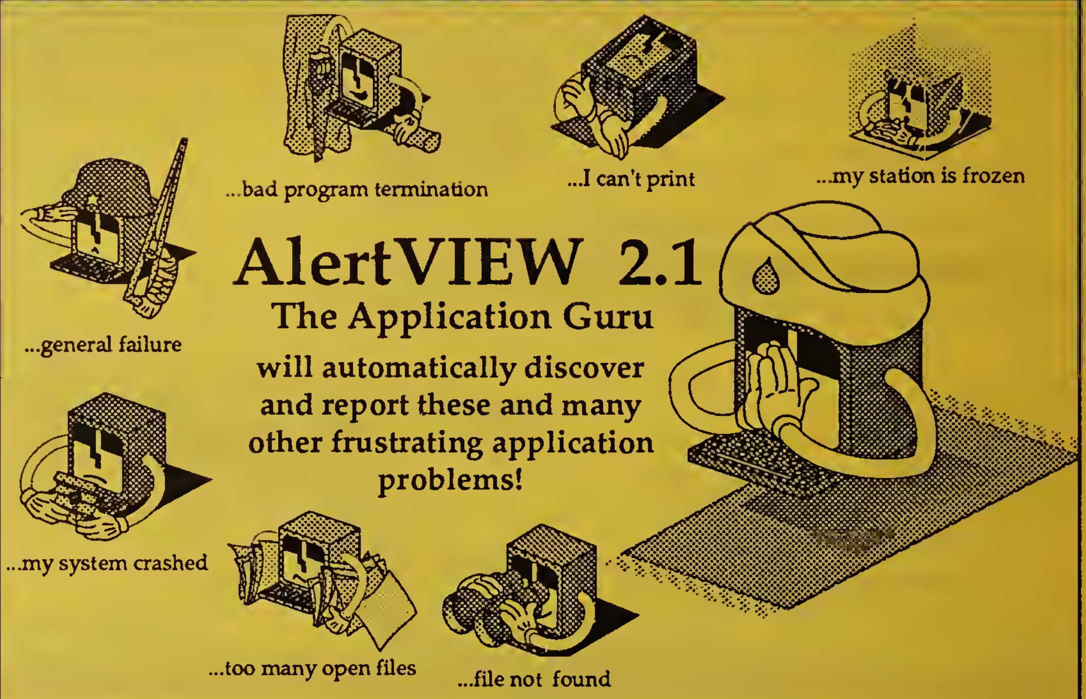

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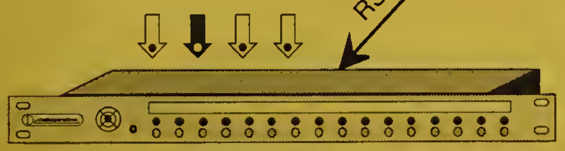

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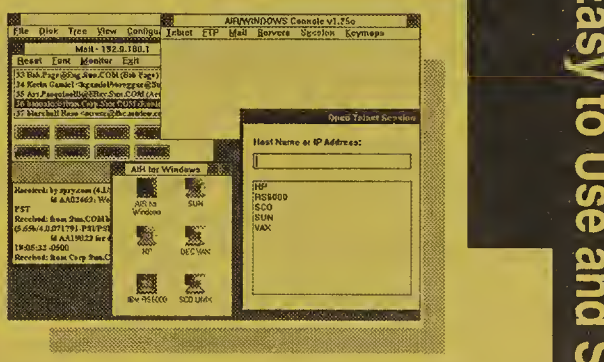

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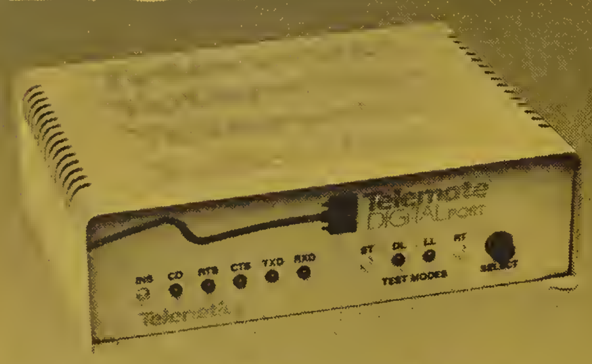

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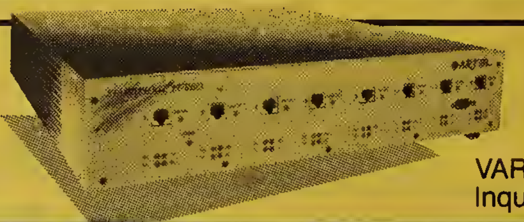

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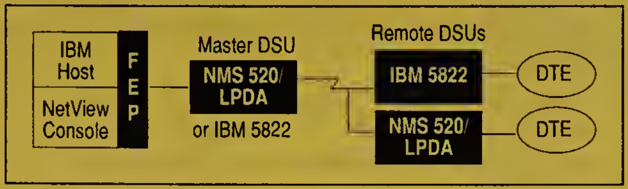

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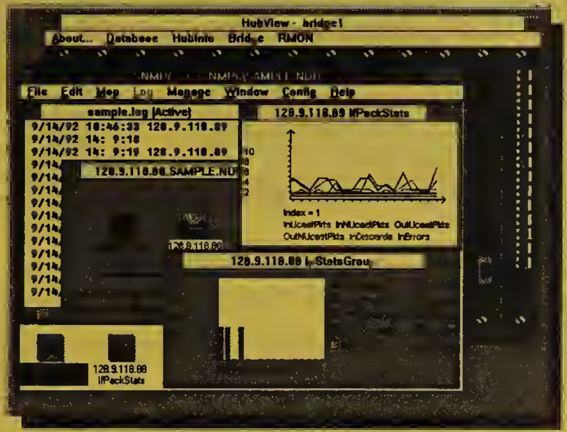

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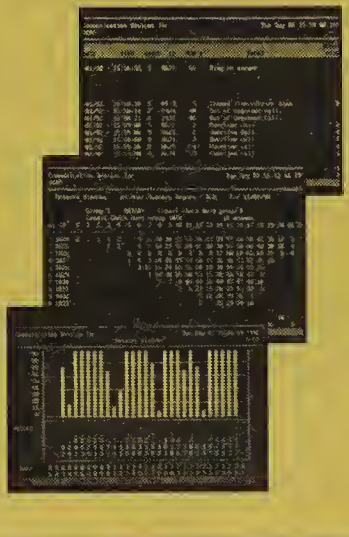

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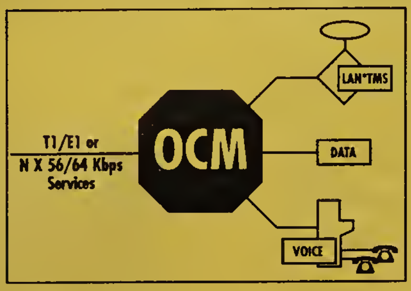

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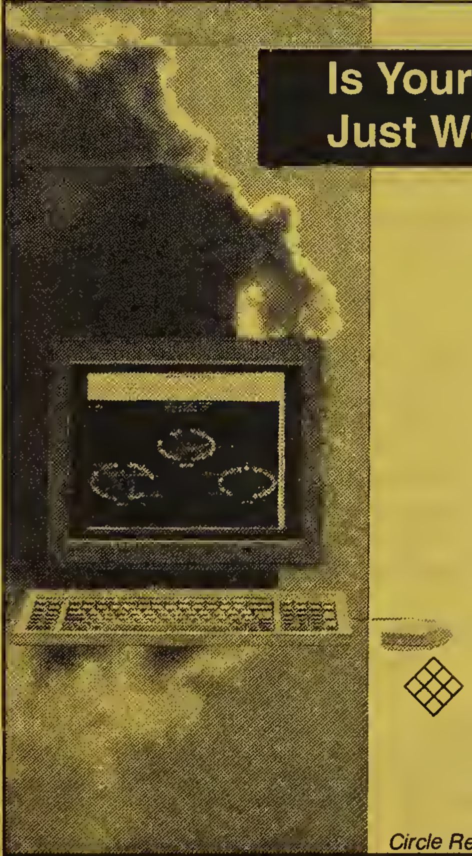

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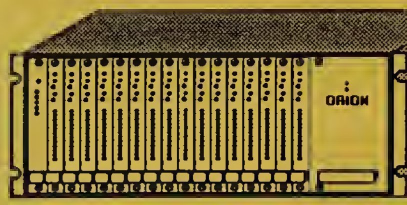

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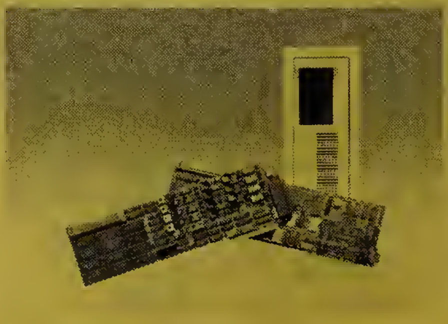

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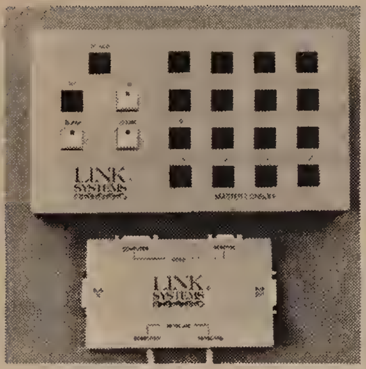

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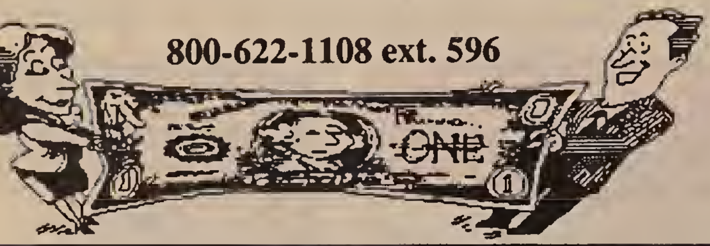

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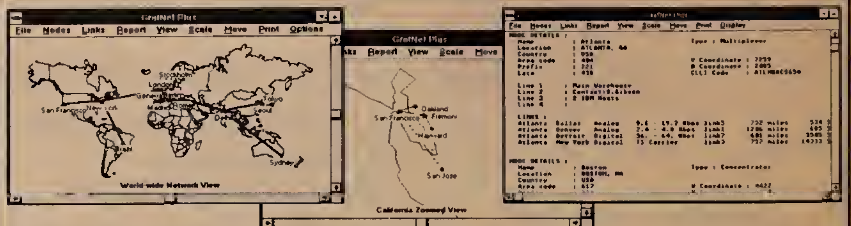

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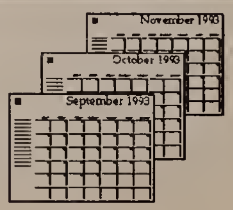

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SNA STRATEGY

SynOptics mgmt. pack is tip of its SNA iceberg

BY SKIP MACASKILL

Santa Clara, Calif.

Providing a glimpse into its SNA strategy, SynOptics Communications, Inc. last week rolled out a management gateway that will let Systems Network Architecture net managers glean information from TCP/IP-based peripheral token-ring networks.

The SNMP Transport Gateway, which is the result of an alliance with SNA connectivity vendor Eicon Technology Corp., will let net managers control and manage remote token rings without installing a Transmission Control Protocol/Internet Protocol backbone.

Management modules in remote Series 3000 and 2000 hubs gather Simple Network Management Protocol data and forward it to the gateway, which includes hardware and software and runs on an OS/2-based platform.

"It's certainly not a huge market, but it's an addressable one. SynOptics is letting everyone know that it is hard at work on SNA integration," said The Yankee Group's Dagres.

The gateway will encapsulate the SNMP data in an Advanced Program-to-Program Communications packet for transport over the SNA backbone net. Since the majority of access lines from remote offices are 9.6K bit/sec, SynOptics will also offer an optional compression feature.

The APPC packet is stripped away when the data reaches its destination and is sent to a corporate SNMP management station, which could be a RISC System/6000 running SynOptics' Optivity net management application on top of IBM's NetView/6000.

WORTH NOTING

In the first quarter of fiscal 1993, SynOptics generated $45 million in revenue from sales of token-ring products, which include modules for its LattisNet System 3000 intelligent hub and LattisNet Series 2000 line of stackable token-ring hubs. Revenue for the category was up 30% over the same quarter last year. SynOptics expects token-ring revenue to crest $200 million by the end of fiscal '93, which is the end of the callendar year.

According to International Data Corp., the 440,000 intelligent token-ring ports SynOptics shipped last year was second in volume only to IBM.

"While users are moving from mainframe-based systems to internetwork-based distributed computing environments, they can't afford to rip out their SNA backbone overnight," said David Brenner, SNA product manager at SynOptics. "This solution lets them leverage what they have today and manage those IP-based token rings as well as avoid the prohibitive cost of deploying routers."

The gateway comes in two versions. SynOptics packages an Eicon SNA Gateway EiconCard that supports either an Industry Standard Architecture (ISA)- or Micro Channel Architecture (MCA)-based personal computer with the TCP/IP for OS/2 protocol stack from IBM.

According to Bill Lanfri, vice president of technology systems marketing for Synoptics, the gateway is just the first in what will be a long line of SNA connectivity products.

"This product is just one indication of our commitment to the SNA integration needs of the user," he said. "We will continue to work closely with Eicon to develop other SNA connectivity products."

Those products will likely include a device that takes SNA's Synchronous Data Link Control traffic and converts it into Logical Link Control 2 traffic so SNA data can travel across token-ring LANs, said one industry source who requested anonymity. "SynOptics has been extremely active in pursuing more partnerships that will help it integrate the IBM environment, and IBM will play a role."

Industry analysts agreed that the gateway announcement was more of a "heads up" move by SynOptics to let users know it was not ignoring the SNA integration market.

"The new gateway will help SNA users that have multi-LAN environments in remote offices but are without a TCP/IP backbone," said Todd Dagres, vice president of data communications at The Yankee Group, a consultancy in Boston.

"It's certainly not a huge market, but it's an addressable one. Synoptics is letting everyone know that it is hard at work on SNA integration," he said.

Based in Montreal, Eicon has been offering a range of SNA connectivity products since 1984, including SNA gateways and a line of emulation devices and software.

In addition to the SNMP Transport Gateway, SynOptics and Eicon are working to integrate other technologies into SynOptics' hub, including downstream physical unit (PU) support, PU concentration, Synchronous Data Link Control-to-Logical Link Control 2 (LLC) conversion and support for X.25/QLLC.

Available in October, the ISA- and MCA-based SNMP Transport Gateways cost $2,495 each.

✆ SynOptics: (408) 988-2400.

Banyan adds NetWare 4.0 support to ENS software

Company also delivers new client support and NetWare directory unification and plans for NT version.

BY SKIP MACASKILL

Westborough, Mass.

Banyan Systems, Inc. last week enhanced its Enterprise Network Services (ENS) for NetWare with support for NetWare 4.0 as well as new client platforms.

ENS for NetWare 1.1 will provide greater interoperability between NetWare and Banyan VINES environments through support for the latest version of Banyan's global directory service, StreetTalk III. What's more, NetWare 4.0 support will let ENS unify NetWare 2.X, 3.X and 4.0 networks under a single directory, which is something even Novell, Inc. cannot do now because 4.0's new directory is different from the naming service used in earlier NetWare versions.

Banyan is also prepping ENS for a number of other operating systems, with ENS for Microsoft Corp.'s Windows NT expected as one of the next releases.

"The new version of ENS for NetWare will help users get closer to distributed computing without changing their NetWare environment," said Jay Seaton, product-line manager for ENS at Banyan. "ENS is really a NetWare add-on, and you could even view it as a sophisticated utility for NetWare."

ENS, which can be used in VINES and NetWare environments, comprises ENS services, NetWare Loadable Modules (NLM) or value-added processes (VAP), and terminate-and-stay-resident (TSR) agents.

ENS services — which include mail, security, net management, administration and directory services — run on a 386-based personal computer that acts as an ENS server. Also, there are NLMs and VAPs that run on the NetWare server, and TSR agents that run on any client in the ENS environment.

"NLMs and VAPs synchronize the services on the 386 box with the bindaries on the NetWare server," Seaton said. "Because they all become one system, the NetWare servers synchronize with each other, as well."

The new version of ENS allows users to access files from VINES and NetWare servers with a single logon because StreetTalk provides a single profile for every device on the network. "Users actually log on to the network as a whole, not to individual servers as they do in NetWare environments," he said.

The earlier version did not support that feature. "There was interoperability between the two environments, but it was in terms of management and messaging security," Seaton explained. "Administrators could manage servers and users on both sides."

Banyan has also extended the scope of ENS by rolling out support for Apple Computer, Inc. Macintosh and OS/2 clients. Previously, ENS only supported DOS and Windows clients. However, Macintosh users must purchase Banyan's Macintosh Option and Mail for Macintosh Option for each ENS server.

Other new features include StreetTalk III application program interfaces to ease development of services such as calendaring and software distribution. Simple Network Management Protocol support for NetWare 4.0 servers was also added, allowing users to manage them from the ENS console, any SNMP management console or through Novell's NetWare Management System.

The firm also rolled out a multiple time zone synchronization feature that will let net managers simultaneously upgrade NetWare servers located across different time zones. ENS users needing mainframe connectivity can now purchase various software options that are installed directly on the ENS for NetWare server. One option, for example, allows DOS clients to emulate 3270-type terminals.

"Banyan has addressed a number of concerns such as lack of support for Mac and OS/2 clients," said Lewis of The Burton Group.

According to The Burton Group, a consultancy in Salt Lake City, Banyan has gone a long way in addressing shortcomings of the original ENS.

"Banyan has addressed a number of concerns such as lack of support for Mac and OS/2 clients," said Jamie Lewis, vice president of The Burton Group. "We'd still like to see the server part of ENS as an NLM because it would make it more powerful and easier to integrate."

ENS for NetWare 1.1 will be available next month. The server software costs $3,995, while the NLM/VAP software is priced between $295 and $3,495, depending on the number of users. The mainframe connectivity options cost between $2,990 and $8,000.

✆ Banyan: (508) 898-1000.

IBM Technology Exchange – Austin

Comm Manager

Continued from page 8

PC/3270-emulation software or 3270 devices linked to a 3174 cluster controller.

IBM will also provide an Integrated Services Digital Network application program interface (API) that will be easier for developers to use than Communications Manager/2's existing device driver-level ISDN API.

All of the enhancements will be announced and shipped by the end of the year, Roth said.

Longer term, IBM is looking at offering versions of Communications Manager/2 for other operating systems. Among the ideas under consideration, Roth said, is to provide its functions in a module that runs on top of Workplace OS, a bare-bones operating system microkernel IBM is developing. The microkernel will be portable to different hardware platforms and will support "personalities" representing different operating systems.

LAN NetView, meanwhile, will be enhanced to support the configuration of LAN-attached DOS and Windows machines from a central console, said Rich Lechner, LAN NetView product manager. Today, the configuration feature, included in the product's Start component, works only with OS/2 clients.

IBM is planning to support the Desktop Management Task Force's Desktop Management Interface (DMI) specification in the second release of LAN NetView. That will let the management system control any desktop device running software that supports DMI.

The second release will also add support for SNMP 2, which will improve security and provide for asynchronous notification, meaning agents can ship alert data to an SNMP manager without being polled. SNMP 2 also lets users gather large amounts of data quickly through an improved GET facility that polls for long strings of information.

NET

Continued from page 1

token-ring, T-3 and Synchronous Optical Network (SONET) adapters — all of which will let the hub anchor collapsed backbone nets and, eventually, ATM wide-area networks.

NET's Adaptive Corp. subsidiary announced the ATMX last year, which is a local-area net work group switch with a 1.2G bit/sec backplane that supports as many as 15 ATM interfaces, each of which has a maximum capacity of 100M bit/sec shared across six ports.

The new ATM Adaption Exchange (AAX) module for the IDNX, which will be available by mid-1994, will allow the multiplexer to support links to local ATMX switches and ATM carrier services, essentially acting as an ATM trunking system for ATM work group hubs and campus ATM backbones.

Maureen Lawrence, vice president and general manager of Adaptive, said the IDNX AAX interface will support ATM Forum-compliant user-to-network interfaces, such as T-3-speed ATM WAN links, as well as standardized ATM adaption layers.

The AAX will perform packet-to-cell conversion, accepting variable-length LAN and IBM Systems Network Architecture traffic and converting it into uniform 53-byte ATM cells for transport over an ATMX backbone.

Similarly, IDNX frame relay and routing functions will be integrated into the ATMX, enabling the switch to support frame relay traffic.

The IDNX, however, will not evolve into a full-blown ATM switch.

Since NET already has a significant installed base of users with time-division multiplexer applications, the IDNX will continue to provide access to switched carrier services or serve as a platform for a private backbone network.

Typically, users would employ ATM in the high-bandwidth pockets of their nets, such as when linking devices within or between buildings in a campus network. The IDNX would be used at other sites requiring T-1 — or 56K bit/sec — services, such as those between a remote site and corporate headquarters.

NET said it will extend the capabilities of its ATMX switch next year to enable it to move from being a mere work group ATM hub to a campus and wide-area backbone switch.

David Owen, NET's vice president of marketing, said ATM will primarily be a backbone premises technology that will supersede shared-media LANs such as Fiber Distributed Data Interface networks.

Next, the technology will begin to extend down to the desktop. At the same time, he predicted, ATM will begin percolating in the carrier environment as a high-capacity, wide-area communications service that IDNX users will employ to augment the basic digital transport net they have in place.

Today, ATMX can be used to satisfy ATM work group applications. But by early next year, Ethernet and token-ring support will be added, enabling users to incorporate other LAN traffic into their ATM networks.

According to NET, it will also add wide-area interfaces, such as T-3 and SONET, to the ATMX by late 1994.

When used in conjunction with a router outfitted with an ATM interface, the ATMX will have the ability to anchor campus backbone nets.

NET said that by 1996, when ubiquitous ATM carrier services and broadband private lines are expected to become available, the ATMX will act as an enterprisewide ATM switch that supports wide-area transport of all net applications.

Adaptive's Lawrence said the ATMX will offer several new software capabilities, such as ATM LAN emulation and congestion management.

✆ NET (415) 780-5232.

Objects

Continued from page 1

CORBA 2.0," said Chris Stone, president of OMG in Framingham, Mass. "This is great because it pushes the standards process along faster."

At last week's Object World '93 here, sponsored by OMG and World Expo Corp., the three companies disclosed their alliance and announced new products.

The agreements also represent an attempt to head off Microsoft, which is developing Cairo, a distributed object-oriented operating system due out next year.

According to vendors and analysts, Microsoft has the potential to step in and dominate the market for object-oriented distributed computing unless there is already a sizable market of CORBA-compliant applications that interoperate across major vendor platforms.

"Either Microsoft will adopt CORBA under pressure from customers or there will be a war between Microsoft and CORBA-compliant vendors," Stone said.

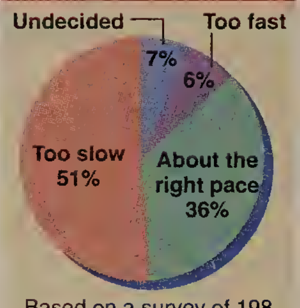
To establish portability between their products, IBM, SunSoft and HP committed to developing a common set of interfaces, based on the OMG's Interface Definition Language, for accessing commonly used object services, such as naming, security and storage as well as ORB facilities not yet specified in CORBA.

IBM officials also said they are in the beginning stages of talking with HyperDesk Corp. and Digital Equipment Corp.

"We plan to detail interfaces used by programmers down to the bit level across our three hardware and operating system platforms," said Jim Green, product manager of SunSoft's distributed object management system, called Distributed Objects Everywhere (DOE).

All three vendors agreed that establishing common application program interfaces would be easy compared to making their products interoperable. In fact, SunSoft did not formally announce it would make DOE interoperable with IBM's System Object Model 2.0 or HP's Distributed Object Management Facility. "We are committed to interoperability, but our lawyers haven't finished writing up the contract yet," SunSoft's Green said.

Satisfaction with object technology development and adoption



Based on a survey of 198 information technology professionals.

SOURCE: OBJECT MANAGEMENT GROUP, FRAMINGHAM, MASS., AND TECHVANTAGE, N.Y.

IBM and HP officials said they will work to hammer out agreements in a number of areas not yet specified by CORBA. These include such things as formats for sending data or messages across networks, object references for uniquely identifying objects regardless of their location and registration of objects within interface repositories.

IBM and HP officials said their first interoperable products will be available in 1994 and will run on HP's 9000 Series and PA-RISC and IBM's OS/2 and AIX platforms.

The integrated products will allow users to implement distributed applications on top of the Open Software Foundation, Inc.'s Distributed Computing Environment), shared-memory or Sockets transport mechanisms, depending on the user's environment.

But most observers said it will be difficult for IBM and HP to integrate their ORB implementations with Sun's DOE because the products use vastly different underlying communications technologies.

"Sun's datagrams and syntax are entirely different from HP's and IBM's," Stone said.

Novell

Continued from page 1

ment. "This is as major an announcement as 4.0 was for us," she said.

Although further details were sketchy, the initiative seems to point up Novell's fear of the looming arrival of Microsoft Corp.'s network-ready Windows NT operating system environment.

As local-area networks earn their stripes as environments for mission-critical applications, users will begin evaluating network operating systems with an eye toward which one makes it easier to develop distributed applications.

There are two primary choices today — NetWare and Unix. But Microsoft being the personal computer software powerhouse it is, NT will arrive with a serious following.

Novell already has its Unix bases covered with its acquisition of Univel, which offers a NetWare-aware, easy-to-use version of Unix System V Release 4 running on an Intel Corp. platform.

So the more pressing question is how NT will fare against NetWare as a development environment.

There are several factors users and vendors will be considering to determine which platform to build on. One of them will be performance — in other words, which platform is faster.

NT looks to have the advantage here. After all, applications are written directly to the core 32-bit operating system, not something layered over a version of DOS.

NT is also a fully symmetric multiprocessing product, meaning it can simultaneously take advantage of multiple processors in a server. This is something Novell does not yet offer.

That performance gain will not show up immediately, however, because the majority of applications are not currently designed to take advantage of multiple processors, said Paul Bandrowski, technology manager at Sara Lee Corp., based in Chicago.

Users will also look at which platform provides for easier application development, another area in which Novell seems to come up short compared with NT and probably the impetus for Novell's announcement next week.

People argue that the most powerful applications in NetWare environments are those that run as NetWare Loadable Modules (NLM), and NLMs are difficult to develop, so NetWare is inappropriate as an application development platform.

"NLMs are lipstick on the pig," said one anonymous source. "If you're used to writing in a grungy, embedded systems environment, NLMs are great. But it's not easy for MIS people or regular software developers. I have no doubt it will be easier to build applications under NT than NetWare."

Beyond the NLM issue, sources are split on whether NetWare or NT applications will be more difficult to build, with many saying they will be equally difficult.

However, the arrival of object-oriented technology, which will play a significant role in Novell's announcement, may let the company put the development issue behind it and focus on its one greatest advantage — its huge installed base.

Cisco

Continued from page 1

work or analog dial-up links at speeds up to 56K bit/sec. Both routers are expected to support features that ease installation, as well as security and remote net management capabilities. A menu-driven configuration program will help nontechnical users configure the routers, and flash erasable programmable read-only memory (EPROM) support will let administrators download new software from a central site.

Both will support the Simple Network Management Protocol and be fully interoperable with Cisco's existing routers. However, unlike existing models, the new routers will not support Cisco's full suite of 16-plus protocols. The routers are expected to handle any combination of four protocols, including the Transmission Control Protocol/Internet Protocol, Novell, Inc.'s Internetwork Packet Exchange (IPX), DECnet and AppleTalk.

They will support transparent and source route bridging, as well as the Open Shortest Path First and Cisco's proprietary Interior Gateway Routing Protocol interrouter protocols.

Analysts said Cisco's existing low-end IGS router lacks the plug-and-play features necessary for wide-scale branch site deployment and costs too much to attract budget-conscious customers at remote sites. The router costs between $4,000 and $5,000 and is not equipped with simple configuration setup procedures or flash EPROM capabilites for remote software downloads.

Robin Layland, an independent consultant based in Hartford, Conn., said the dearth of low-end gear in Cisco's line has enabled smaller vendors to infiltrate Cisco customer ranks. "Cisco is looking to protect its installed base," he said.

International Data Corp. (IDC), a market research firm based in Framingham, Mass., said low-end routers already account for 50% of the market — a figure that will grow to 60% to 70% during the next few years, according to estimates from IDC and other companies.

Wellfleet Communications, Inc. is also planning to get into the low-end router arena. David Yates, director of wide-area access products, said Wellfleet will begin rolling out by year end a line of routers to match Cisco's offering. Wellfleet's lowest tier router today, the Access Feeder Node, costs almost $7,000.

Wellfleet penned a partnership agreement with Novell, Inc. this spring to develop remote access products and ensure interoperability between Wellfleet routers and Novell's PC- and server-based routers.

Sync

Continued from page 1

E-mail systems, most of which have limited capabilities for updating the directories of other systems when a user address has been assigned or deleted from their database.

The problem is exasperated by the fact that users have begun looking to directories as repositories for all kinds of information beyond E-mail, including human resources and net configuration data.

"We all want to get to X.500, but we absolutely need something to solve our current problems with directory synchronization," said Pete Donaghy, manager of customer services and the support laboratory at Hughes Aircraft Co. in Long Beach, Calif.

Alexis Bor, who is involved in directory services at Boeing Computer Services, gave a widely hailed presentation in which he spoke on behalf of the OSI Implementors Workshop (OIW) Directory Services Special Interest Group (SIG).

The OIW group has proposed to use a customized version of the 1993 X.500 Directory Information Shadowing Protocol for bridging the gap between proprietary and X.500 directories. This would involve developing a replication gateway that would handle the import and export of directory changes in a basic flat file format between X.500 Directory Server Agents and proprietary directory servers.

According to some participants large firms, such as Boeing, might not represent the E-mail user community at large, especially since many companies are not even close to moving to X.500. Given these concerns, the EMA plans to conduct a survey of its members to solicit their opinions on directory synchronization.

"A lot of the large users have already put together homegrown solutions or use an automated synchronization system from one of the vendors," said Gary Rowe, a principal at consultancy Rapport Communication in Cincinnati. "It appears their perspective is that they'd rather wait for [products based on X.500] than have to deal with a de facto synchronization standard."

Boeing's Bor agreed with an OIW Directory Services SIG recommendation not to build a new API because such an undertaking would probably take at least two years and it might be longer before products based on it would emerge.

Representatives from a slew of large user organizations were in attendance, including Chase Manhattan Bank, N.A., Chevron Information Technology Co. and Martin Marietta Corp.

The vendor presentations by DEC, Novell, Retix and Soft-Switch dealt mainly with those vendors proposing their own directory synchronization technologies as the possible basis for a common specification. Retix, for example, pitched its Directory Exchange protocol, while Soft-Switch offered up its Directory Synchronization protocol for coordinating disparate E-mail directories.

Mike Zisman, president and chief executive officer at Soft-Switch, said XAPIA should take the best technologies from all of those submitted and come up with a common specification.

"The last thing we need is another [VIM/Messaging Application Programming Interface] embarassment," he said, referring to the political and technological battle that has emerged in the mail-enabled application API area involving Lotus Development Corp. and Microsoft Corp. "Users will go nuts if that happens." ◘

Val Shribar, a senior network analyst at META Group in Reston, Va., said Cisco and Wellfleet are seeing a ground swell of demand for remote-site devices. "I'm hard-pressed to find a Fortune 500 company or any vertical industry that doesn't have a need to extend its LAN highway," he said.

"But pricing is critical because of the multiplier factor. Whatever the cost of the box is, you need to multiply that by 50, 100 or even 1,000 [remote sites]," he added.

Cisco's and Wellfleet's moves spell trouble for small players such as Telebit Corp. and may put pricing pressure on more established vendors such as Advanced Computer Communications (ACC), Proteon, Inc. and 3Com Corp. Telebit's NetBlazer dial-up router costs $3,000, while ACC's Nile dial-up router and 3Com's Boundary Router are priced between $3,000 and $5,000.

Proteon's DNX 300 router costs between $5,000 and $8,000.

Cisco's new products will be available through its direct sales force and value-added resellers (VAR), as well as through distributor channels that Cisco has not utilized before.

Gary Bowen, Wellfleet's senior vice president of marketing, said Wellfleet will announce an agreement in July with mass distributor Anixter Corp., whereby Anixter will resell Wellfleet's low-end router gear throughout North America. It will be Wellfleet's first foray out of the direct and VAR channel.

Cisco: (415) 326-1941. ◘

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